Mapping Technological Causality:

A visual exploration into processes of technological and informational overload.

By

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Abstract

This research focuses on a visual exploration of technological and informational overload. It places emphasis on the encoding and modelling of technology utilising a range of theoretical sources and understandings to explain this. This conceptualisation of encoding as integral to our subjective relationship with technology is also coupled with an understanding that technology progresses at an exponential rate.

The artwork that creates a dialogue across these ideas is constructed using systems, codes and formulas to create a sprawling installation. The various component parts of the installation can be viewed both as discreet elements and as sections which combine to form a unified whole. The larger installation (whole) will be organised through the dynamic of exponential growth and is made up of painting, drawing, sculpture and video and contains a limited number of visual motifs which evolve and mutate through each medium. These visual motifs or elements are chosen based on rules and categories that are encoded within a series of charts (akin to a Table of Elements). The use of map-like charts, tables and diagrams plays a vital role in the installation and exegesis as they function both as a 'part' of the whole and as indicators of how to navigate its complex circuitry.

The exegesis which supports the gallery work has in certain ways moved away from the standard model of reflection and support and takes inspiration from both Alfred Jarry's fictional science 'pataphysics' and Deleuze and Guattari's concept of the rhizome. The exegesis creates a fluid link to the gallery work, utilising the accompanying maps and charts to create a circuit of information that moves between the two. It uses an organisational framework, borrowed from the rhizome, that makes horizontal or lateral connections between otherwise unrelated facts and disciplines; and sidesteps the more standard linear and vertical relation to context or contribution.

The project will draw artist's work into the rhizomatic structure of the paper, discussing conceptual approaches and methodologies in relation to the overall structure of the paper and installation, creating a nuanced network of ideas and relationships that deepen and extend the reach of artwork and thereby creating a refined sense of the work's significance both within its localised, physical and conceptual parameters and within the larger contexts that it draws on. The domino effect video piece titled The Way Things Go (1987) by Peter Fischli and David Weiss coupled with Paul Virlio's writing on the interconnectedness of the global technological systems is an example of this. As is a discussion of Matthew Ritchie's work The Propositional Player through Jean Baudrillard's analysis of the masses from the text In the Shadow of the Silent Majorities.

The project, by becoming or inhabiting the processes of exponential growth and change and by suggesting a web of complex associations and pathways, visualises new ways of understanding our multi-faceted relationship to these issues.

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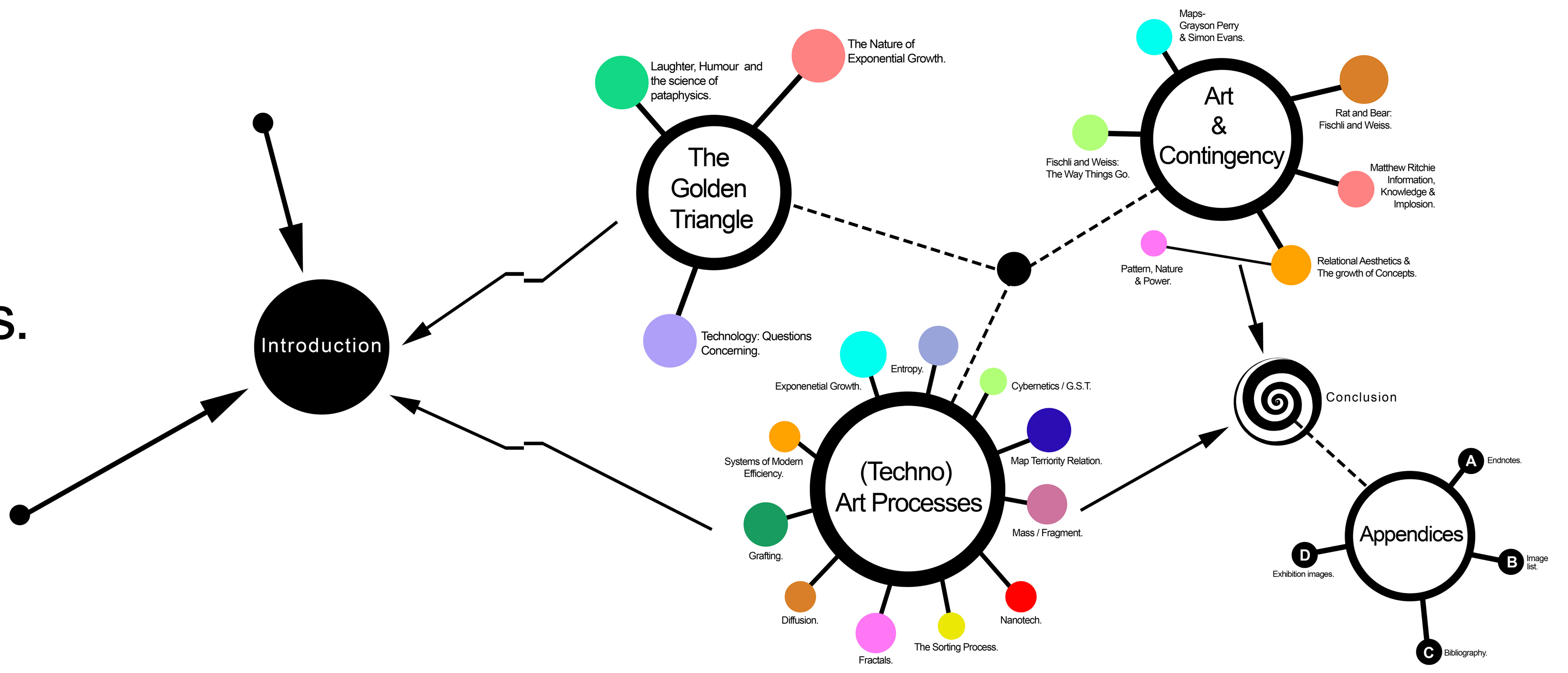

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Translator’s introduction

The following translated text is an extension of the research project and a comment on technology and knowledge structures in a high-tech world. In his project, the artist has focused on exploring certain aspects of technological growth in the world and how the individual/collective relates to this. The rapid increase in the production of technology and the psychological response it creates is the initial driver of his work. As will become apparent, the project is steeped in a tradition of philosophical enquiry, and for the issues it seeks to explore the medium of the essay and the aphorism have become redundant.

The question of technology is located in a particular canon of thought which in a modern sense follows from Alfred Jarry (pataphysics), Martin Heidegger, Marshall McLuhan, Jean Baudrillard, Gilles Deleuze, Paul Virrilio and Ray Kurzweil and in the domain of art encompasses Marcel Duchamp and other Dadaists, Matthew Ritchie, John Bock and Jean Tingley, to name but a few. These thinkers have in common their denial of a simplistic understanding of technology and an obsession to expose and comprehend the model that they see as constituting our understanding of reality. Like ideas derived from map/territory relation theory which argues that the territory will always elude any true representation of it, the same becomes true for the territory of thought. Gregory Bateson, in ‘Form, Substance and Difference’ from ‘Steps to an Ecology of Mind’ (1972), elucidates the essential impossibility of knowing what the territory is, as any understanding of it is based on some representation:

We say the map is different from the territory. But what is the territory? Operationally, somebody went out with a retina or a measuring stick and made representations which were then put on paper. What is on the paper map is a representation of what was in the retinal representation of the man who made the map; and as you push the question back, what you find is an infinite regress, an infinite series of maps. The territory never gets in at all...always, the process of representation will filter it out so that the mental world is only maps of maps, ad infinitum.[1]

Or Deleuze:

Maps, on the contrary, are superimposed in such a way that each map finds itself modified in the following map, rather than finding its origin in the preceding one: from one map to next, it is not a matter of searching for an origin, but of evaluating displacement.[2]

From an understanding of these quotations it's hard to see the map or model (an abstracted representation masquerading for the real) not imposing itself completely on our perceptual fields as we direct ourselves within our lives. From clothing to food to social interactions this world turns the more sensuous, random, localised and unpredictable: into a set of digital rules, customs and mass produced trends that follow. This process defines and judges itself by how efficiently engineered and economically streamline the circuits it creates and maintains becomes.

In varying degrees, many of the main theoretical references for this exegesis are aware of this and seek not just to expose and illuminate these phenomena but to create whole new ways of knowing and new parameters for what could be known; to create a different, more productive version for how the model could operate in life and society. The work travels along this same trajectory but it’s more a carnival than a dance of the dead or a battle-cry. Let’s have some fun with our confusion, with our illusions, with our virtuality.

The presented work is a world lost in models but simultaneously trying to reconstitute something new out of them; to see things perpetually and densely connecting to everything else and not solely in isolation. The approach has been to recreate the density and informational layering that accompanies the technology mediated environments produced in the contemporary world, as well as alluding to the organismic qualities inherent within technology (although it seems the growth of technology exceeds the homeostatic equilibrium normally associated with the organism). This has occurred through building up a vast array of different systems, codes and circuits that interconnect as they move through different mediums. The various aspects utilise simple guiding formulae and schemes abstracted from areas of science and mathematics which gradually get more and more complex as they build up over time.

The notion of locality and context is vital in understanding the rationale for the structure and conceptual methodologies the project follows. Falling outside the standard model for reflection and discussion of the studio work, this exegesis on a micro level undermines the model it finds itself conforming to. Not without precedent, this inclination finds guidance in the rebellious playful nature of pataphysics, the organisational tendencies of the rhizome and the early creative confrontations of Marcel Duchamp. All three tendencies share a renegade approach to the denial or disruption of a dominate way of thinking in favour of an individualistic and unique alternative and they shall be discussed in turn.

Pataphysics

Alfred Jarry's pataphysics* is a philosophical precursor that constitutes this sense of playfulness and creates a strong contextual link for the project and that of a philosophical machine. Pataphysics is somewhat of a joke (or perhaps) a pseudo philosophy/science but in its ability to be humorous and unconstrained lies its strength and importance. Pataphysics falls outside of convention and pre-existing models of prescriptive thinking. In particular, it privileges the exception over the general.[4] In Jarry's words:

Pataphysics will be, above all, the science of the particular, despite the common opinion that the only science is that of the general. Pataphysics will examine the laws governing exceptions, and will explain the universe supplementary to this one; or ambitiously, will describe a universe which can be – and perhaps should be – envisaged in the place of the traditional one......Pataphysics is the science of imaginary solutions.[5]

Gilles Deleuze addresses Jarry's thought as an important precursor to Martin Heidegger’s work in the essay ‘Alfred Jarry unrecognised precursor to Heidegger’ (from the book ‘Selected Essays Critical and Clinical’). In this he makes the claim that the form of technological theorising that Heidegger develops in his later writings exploring such concepts as ‘enframing’ and ‘standing reserve’ follows a line of enquiry set in motion by Jarry 40-50 years before.

The great resemblances, memorial or historical, concern the being of phenomena, planetary technology, and the treatment of language... In the first place, pataphysics as the overcoming of metaphysics is inseparable from a phenomenology, that is, from a new sense and a new comprehension of phenomena.[6]

This line of enquiry creates a problematic space or sentiment with which to understand technology from. Far from Luddite and far from a static set of ideas to refer to, it sheds light on the shaping effects technology has in the world; as universal coloniser of truth and how this in turn 'enframes' potential decisions within a modern techno-scientific world. Summing up, much like phenomenology which arose at a similar time, pataphysics (with much more sense of playfulness) seeks to privilege the subjective experience, as a foundation to proceed and understand our place in the world and the knowledge we create about it.

How one deals with and activates Jarry's ideas (similar to Deleuzian concepts) depends on context, locality, time and conditions but above all one that privileges human subjectivity and experience within it.

The Rhizome

The rhizome understands that pathways to existing knowledge can be many and varied. The network might have a 'logical' or definable arrangement but the clusters of networked knowledge do not have to be the standard, accepted histories of the traditional hierarchical structure. The rhizome allows connections to be made laterally between otherwise disregarded facts and various disciplines.

The desire to create a new framework and logic for the text to accompany the gallery work is an expression of these ideas. Rather than a purely descriptive dichotomous relationship, the exegesis extends the circuit initiated in the gallery work – a structural and informational circuit with a fragmentary make-up yet somehow generating a certain form of holographic unity. This unity is understood only in a temporary sense as a frozen moment before the next wave of uncontrollable growth reorientates and mutates the work’s present form into a new arrangement; utilising the potential of the codes and systems inherent in the work.

The paper is to be seen existing in the same process not just as its own isolated part or section but as a direct extension from the gallery work and accompanying information panels. In the same way that the gallery work creates a multi-directional circuit between the mediums of sculpture, model-making, painting, drawing, video, photography and the accompanying information panels, the paper is to be seen existing in the same process.

The rhizome plays an epistemological function in Deleuze’s grander philosophical framework. This philosophy questions whether an image of thought can ever bear any resemblance to the metaphysical flux we live in, rather than evaluating concepts based on questions like 'how true is it'? Deleuze poses the question: what are the cause and effects of concepts in how they restructure our lived experience in reality or in Deleuzean terms as desiring subjects. The framework for producing knowledge for Deleuze is to be understood as an entity and just like other entities in the world, has gone through a series of forces and processes which has materially and socially produced it.

Marcel Duchamp

Marcel Duchamp’s antics in an artistic sense create a strong contextual link to understanding the desire to side step and re-evaluate the standard research model and replacing it with new modes of inquiry. Duchamp's use of mundane everyday materials, his vast collection of notes accompanying work, the random and contingent and his debt to the pataphysical tradition do also.

In a particular way, the project’s connection (or refusal of) to a 'contextual field or fields' (in the more standard self-reflective sense) can be understood as a reflection on contingent aspects to this construction. How is creative research assessed and verified? And how does it become understood as knowledge? Like technology and information, concepts also grow at an exponential rate. The art world is a world of concepts continually multiplying as originality aims to define and redefine itself more and more. In this world of exploding concepts and complexity, the breath of connections this artistic practice can make, becomes one of choice and persuasion; a somewhat random idiosyncratic sorting process. This culminates in the accompanying story we tell. This sorting process simultaneously exists in the many areas of inquiry the project could align itself with and the vast number of artists that fall within each of these categorical banners.

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Like the everyday household assemblages of Duchamp’s bicycle wheel and stool which confronts audience’s pre-conception of what could be understood as art, the thesis presents a new form and research orientation to mutate content into another way of presenting it. Much like the self-contained world of the ‘Bride Stripped Bare’ and the vast amount of notes and explanations enveloping it, this project develops its own sense of language, placement and internal connections.

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* **Pataphysics** The following is a small sample of well-known thinkers which have been directly influenced by Pataphysics in some way and some of these connections. Marcel Duchamp, Palbo Picasso, Umberto Eco, Raymond Queneau (co-founder of Oulipo group), and Jean Baudrillard have all at some time been members of the college of Pataphyisique (a pataphysical institute set up to further the sentiment of these ideas, although in a some contradictory manner). Jean Baudrillard’s (who is most noted for his writing on semiotics of consumer objects and the concept of hyperreality) first ever text produced was titled Pataphysics and is a teasing out of the Pataphysical spirit as it relates to his interpretation of Jarry's ideas. Asger Jorn, a Danish artist, close friend of Guy Debord and co-founder of the Situationalist movement, utilised methodical processes aligned with Pataphysics and in 1961 published an essay titled ‘Pataphysics a new religion in the making’. A more comparative understanding of Pataphysics can be found in the essay ‘An Unrecognised Precursor to Heidegger: Alfred Jarry’ an essay by Gilles Deleuze from the text ‘Essays critical and clinical’ (1993). 3

If a picture paints a thousand words, then these art assemblages open a thousand angles on the machinic phylum* and how it traverses society and individuals. This machine is not disguised, not predatory. It is a fairground, a fun house, a hall of mirrors, a circus, extra dimensions popping out as the machine gains momentum: audience, artist, curator, gallery, translator, purchaser all hooked up in a vast circulating mechanism, propagating shocks and illumination.

Philosophical machines have a long history. The earliest philosophical machine was probably something like the talking circle, where the symbolic staff is passed around to denote turns, the staff being a sublimation of the weapon and the act of yielding. Symbolism and sublimation slowly yoked a portion of man's vital energies to the production of concepts. But let us be precise when we talk about philosophical machines. Obviously we must be clear on our definitions of both philosophy and machine. For philosophy we might propose various definitions; love of wisdom, the creation of concepts, the linking of differing fields of thought. Obviously it deals with thought and the notion that thought is worthy in and of itself.

Machines pose no less a problem if we really want to grasp the essence, but let us settle with the common-sense notion that a machine is an assemblage for the transmission and transformation of a force for a purpose. A philosophical machine must then be an assemblage that performs transformations of thought and force and transmits those transformations. For a purpose. And so often that purpose is the purpose of power. Witness the age old marriage between the priest and the king, the technocrat and the state. In this sense, knowledge and power are entwined, history belonging to the victor, speech to he who bears the staff.

This machine is very different. Not a royal machine, not a state machine but a nomad machine. A Machine that seeks not to consolidate power but to escape it, to evade and avoid it, confuse and confound power wherever it is concentrated, to surf dangerously over and around gradients of energy, to keep from freezing into crystalline stasis and falling into thrall with false identities and ideologies. A Frankenstein birth in a renegade laboratory is a good metaphor for the processes of creation that went into this mutant child. It is rude, it is insulting and disobedient, comical and innocent, it is like all good children, existing purely for its own sake. It is apolitical in so far as it is protean. It verges on the cusp of organism, living off the pure joy of circulation, of movement, of colour and sound. Simply by modifying slightly the boundary between audience, installation and artist, the beast could be awoken, becoming self-renewing, self-replicating, conjugating with the brooding amoebic forms pullulating in our own puddles of artistic and conceptual refuse.

As the viewer ponders, ruminates, stalks here and there, you are the gears and pulleys of this revolutionary machine; that with a simple oscillation could transform an art gallery, an empty room, a warehouse, into an orbital escape vehicle, a platform for viewing the greater machines that dominate our social and eco systems and the much more primal forms of the machinic phylum that drive those assemblages.

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*The machinic phylum is a term which was coined/placed in its current context by Deleuze and Guattari in their seminal work 'A Thousand Plateaus: Capitalism and Schizophrenia':

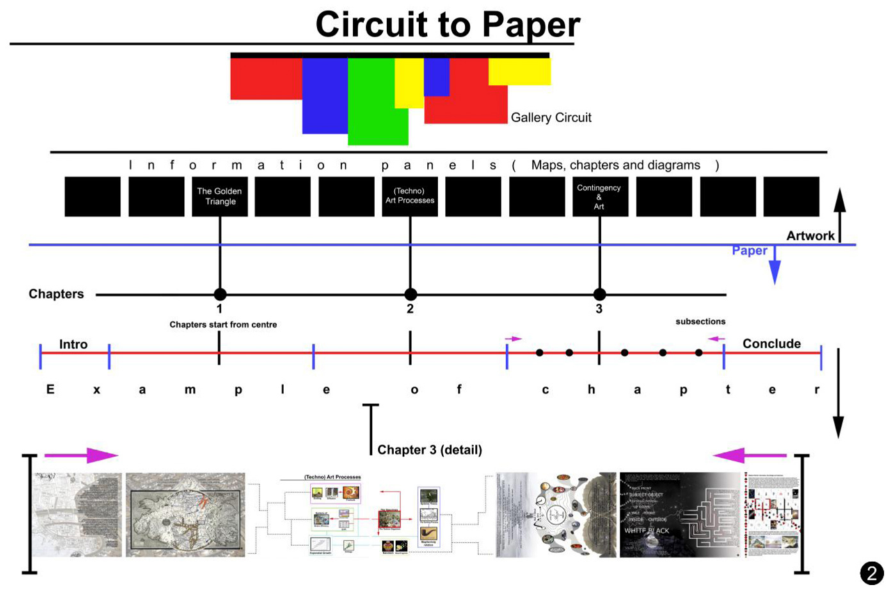
"The machinic phylum is materiality, natural or artificial, and both simultaneously; it is matter in movement, in flux, in variation, matter as a conveyor of singularities and traits of expression. This has obvious consequences: namely, this matter flow can only be followed...the artisan is one who is determined in such a way as to follow a flow of matter, a machinic phylum. The artisan is the itinerant, the ambulant. To follow the flow of matter is to itinerate, to ambulate. It is intuition in action." (Deleuze and Guattari 1987, 409)

Working in this tradition, Manuel de Landa has defined the Machinic Phylum as the "set of all self-organizing processes in the universe" (WITAOTIM) In that same text he... defined the machinic phylum as the set of all the singularities at the onset of processes of self-organization — the critical points in the flow of matter and energy, points at which these flows spontaneously acquire a new form or pattern. All these processes, involving elements as different as molecules, cells or termites, may be represented by a few mathematical models. Thus, because one and the same singularity may be said to trigger two very different self-organizing effects, the singularity is said to be 'mechanism independent'. (De Landa 1997, 132)

So the machinic phylum is simply the notion that as soon as you let matter and energy in any form (whether it is organic or inorganic) flow in a nonlinear manner (that is, past a certain threshold of complexity) machines will tend to spontaneously self- assemble. The key word here is "nonlinear." When you let matter and energy get far from equilibrium, spontaneously stabilized states called "attractors" emerge. [7]

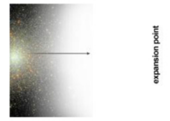
Navigating the text

The three main chapters that make up the exegesis are expanded versions of different maps/charts/formulas taken from the larger series in the gallery space.

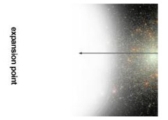


The red/yellow/green coloured sections in the diagram above refer to the sculptural/2-D and video aspects of the gallery work. Working down from this is a series of black rectangles which represent a vast number of maps/charts/diagrams that will accompany the gallery work. Many of these also appear in the exegesis and three in particular form the basis for the paper's chapters.

These chapters begin (roughly) in the middle where the tabs indicate. Each chapter can be read from left to right/right to left. They should be read from the outside in – from the middle to the periphery. Each central diagram contains a series of directions to further information regarding ideas connected to the maps creation. There's no reason not to read the paper from start to finish nor is there any reason to not to read it in a non-linear order that suits or interests the reader.



On both sides of this paragraph appear the expansion point indicators which delineate the end of a chapter. As the reader migrates from the centre of each chapter to its periphery these signs designate a chapter's end and specify to the reader to either proceed to the next chapter or return to the central diagram to read the chapters content that appears in the opposite direction.



The text is about content as much as the dynamics that govern the whole project – form becomes content – knowledge becomes movements/intensities within both form and content.

expansion point

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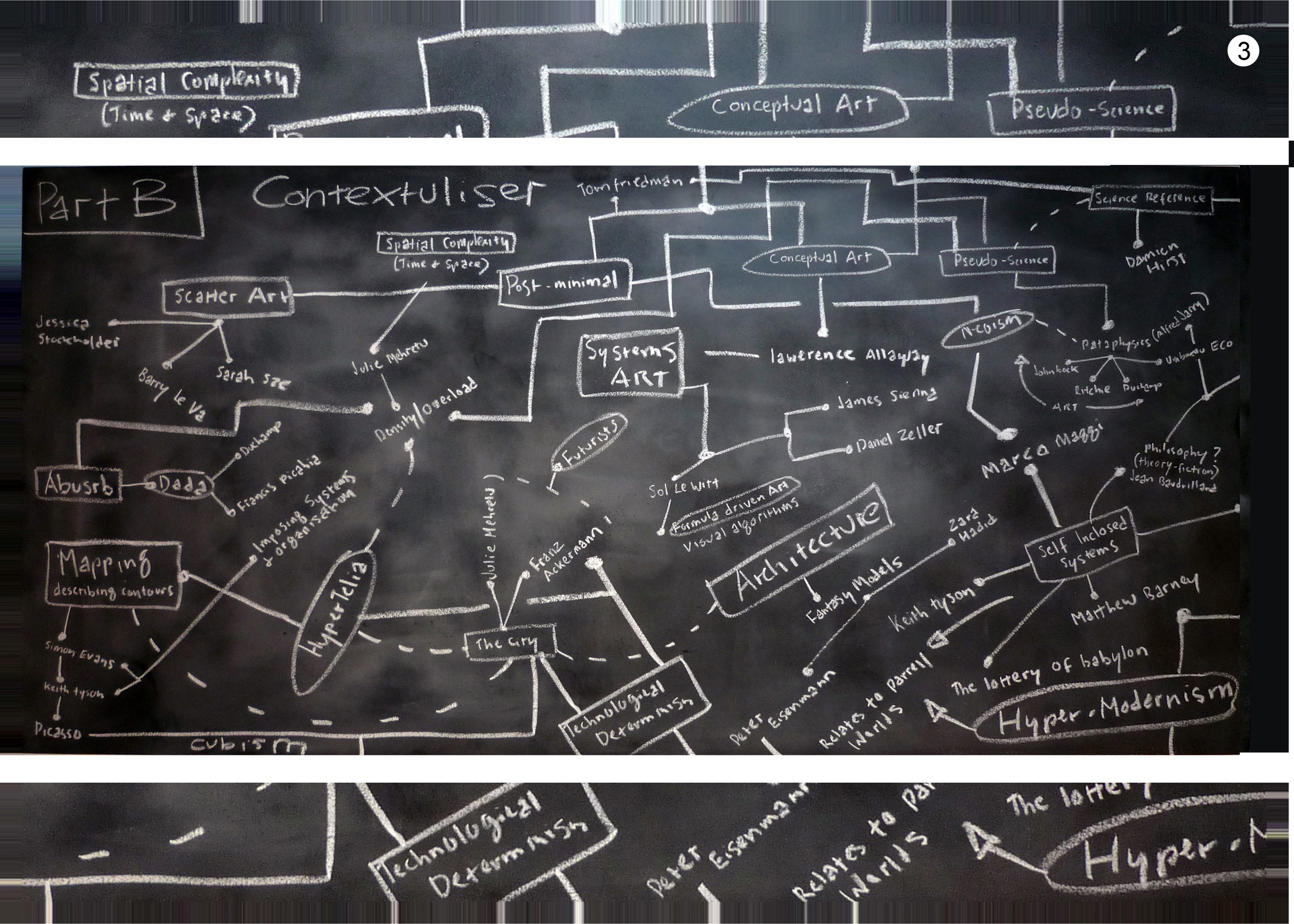

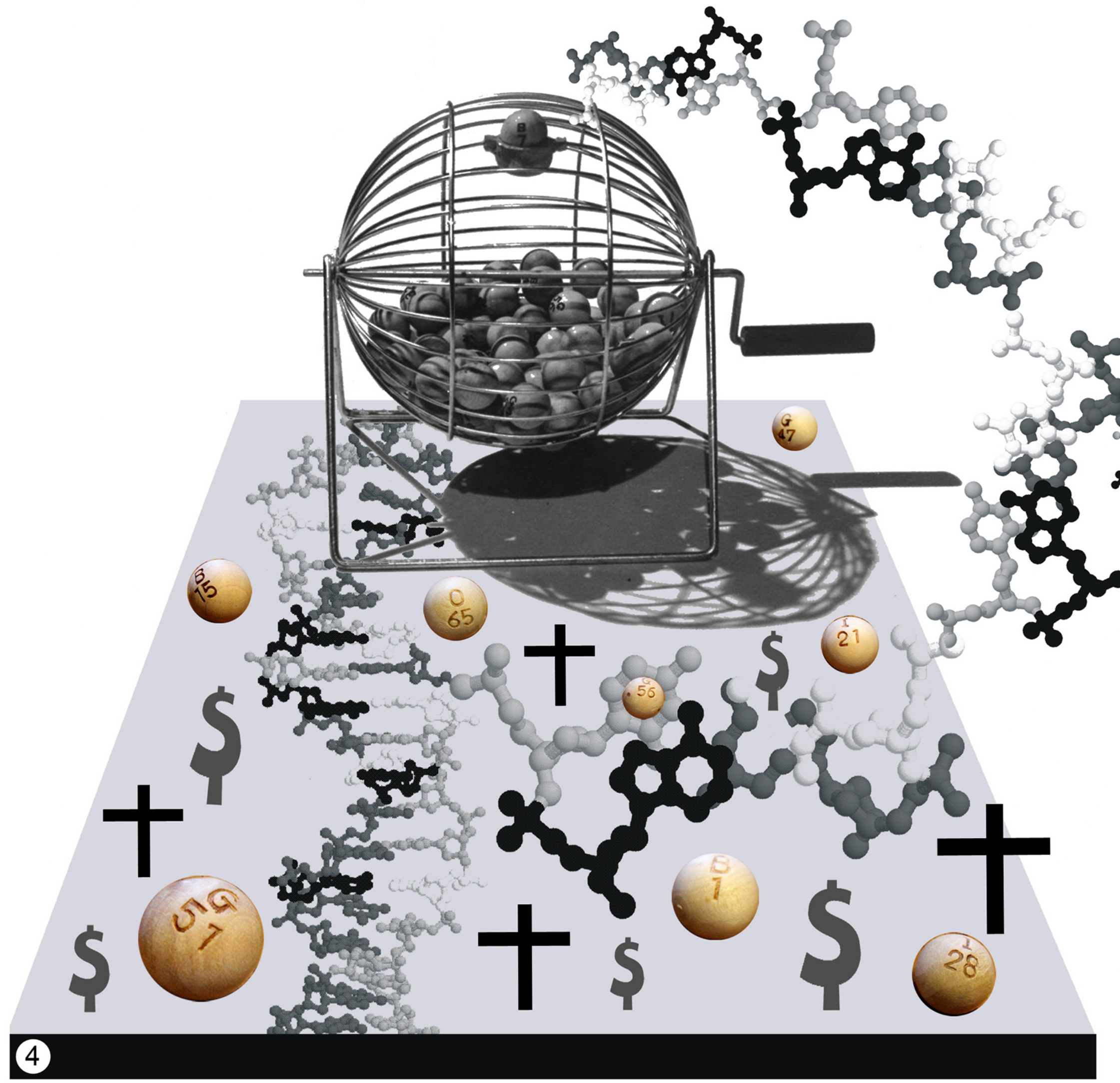
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Moving from the illusionary situation entwined with humanity's faith in truth which Nietzsche describes as a type of prison, the rest of this article will discuss the purpose of the artist or what Nietzsche describes as the freed intellect and their ability to recognise the absence of any fixed truths. The systematic nature of these 'truths' derived from their long usage and (hence their stratified form) means others in society (at times) fail to realise their temporary, ephemeral nature. The artistic impulse as described by Enns is a discovery which the artist re-enacts through the building of a temporary, artificial structure, which the artist destroys and then re-assembles "ironically, pairing the strangest, (whilst) separating the nearest items". (16)

All avant-garde practice exhibits these compulsions, fundamentally altering the vision and the potential of the art form as well as the commentary that it is possible to make within it. However, like all advancements, it too, slowly becomes absorbed and made routine, standardised by a systematic process which needs an explanation and category for everything: what is its purpose, its objective and its points of comparison? Creating a historical line from, say, Duchamp's groundbreaking actions of the early 20th century to now, you can see how something so revolutionary has been gobbled up by the same system it sought to attack and offend. It is now a standard conventional approach to the production of art. However, this inclination to side step and disrupt the tendency for human thought to conventionalise never ends, it just becomes a larger, tighter and more interconnected artificial structure to poke at.

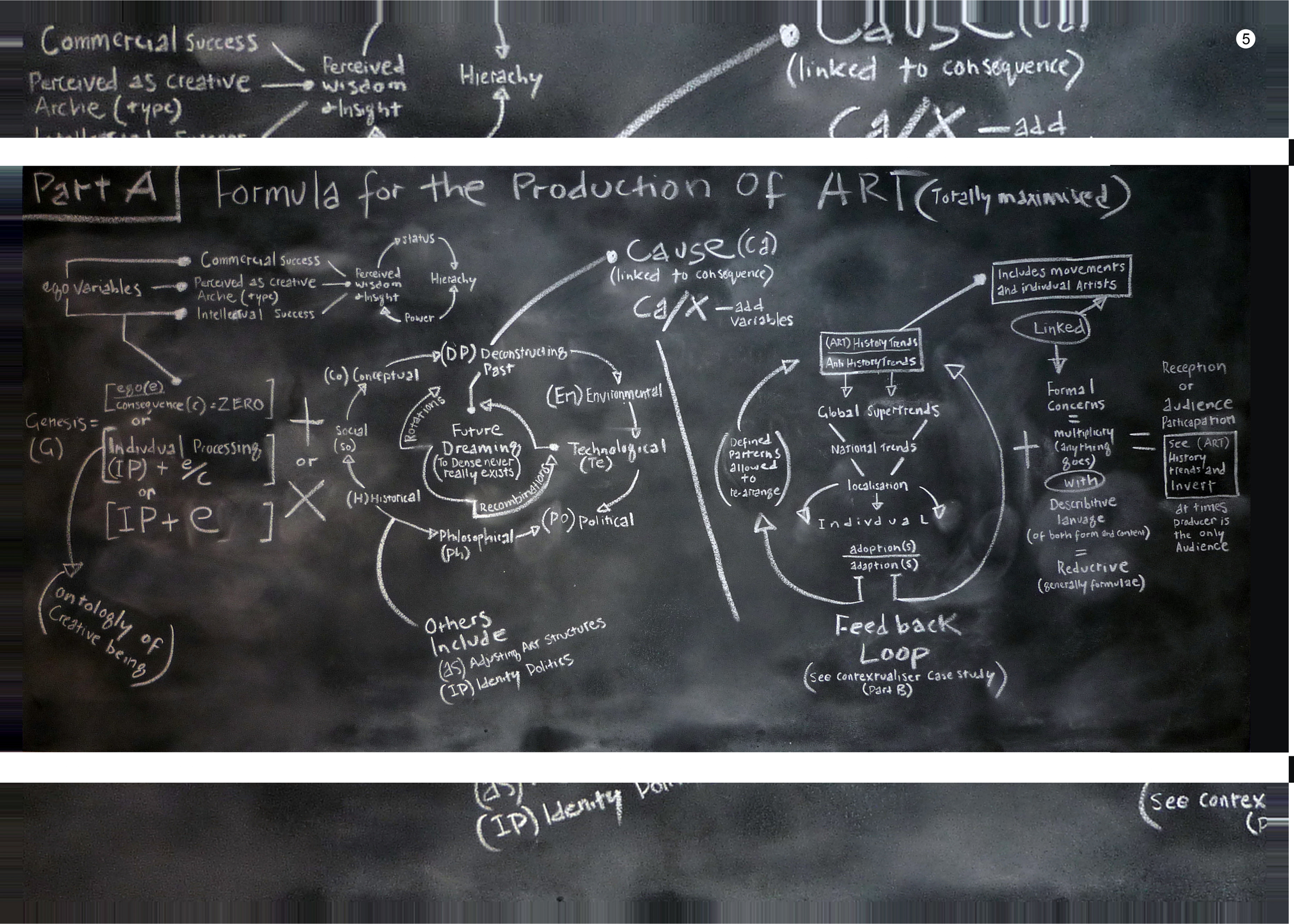
The growth of fictions and their ability to shape and mould human behaviour around them is the central focus of Jorge Luis Borges' short story 'The Babylon Lottery'. In this, he describes a world which is caught in the grip of an almost religious obsession with a form of lottery based on the distribution of both rewards and punishments. Participation eventually becomes mandatory for all in society except the elite. Through its prolonged historical usage, passing from one generation to the next, this form of gambling which has a profound effect over the social dynamics of Babylon's inhabitants, has lost its source of origin, now just operating as a mere simulation in the social field (with no understanding for how or why it came into being).

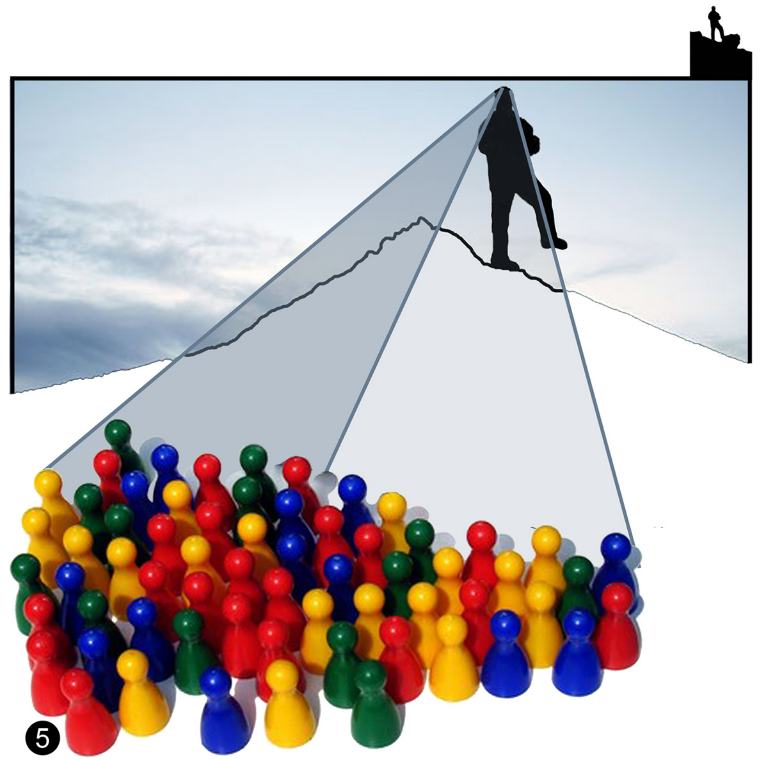
The story refers to the very foundational nature of fictional structures within human thought and the embedded role of chance in its development as alluded to by both Nietzsche and pataphysics. But just as much it could signify anything particular existing in this guise. The moral framework of religion? The enigmatic mechanisms of the international banking system and its genesis?

From The Babylon Lottery- Jorge Luis Borges-

"My father related that anciently - a matter of centuries; of years? - the lottery in Babylon was a game of plebeian character. He said (I do not know with what degree of truth) that barbers gave rectangular bits of bone or decorated parchment in exchange for copper coins. A drawing of the lottery was held in the middle of the day: the winners received, without further corroboration from chance, silverminted coins. The procedure, as you see, was elemental.

Naturally, these "lotteries" failed. Their moral virtue was nil. They did not appeal to all the faculties of men: only to their hope. In the face of public indifference, the merchants who established these venal lotteries began to lose money. Someone attempted to introduce a slight reform: the interpolation of a certain small number of adverse outcomes among the favoured numbers. By means of this reform, the purchasers of numbered rectangles stood the double chance of winning a sum or of paying a fine often considerable in size. This slight danger - for each thirty favoured numbers there would be one adverse number - awoke, as was only natural, the public's interest. The Babylonians gave themselves up to the game. Anyone who did not acquire lots was looked upon as pusillanimous, mean-spirited. In time, this disdain multiplied. The person who did not play was despised, but the losers who paid the fine were also scorned. The Company (thus it began to be known at that time) was forced to take measures to protect the winners, who could not collect their prizes unless nearly the entire amount of the fines was already collected. The Company brought suit against the losers: the judge condemned them to pay the original fine plus costs or to spend a number of days in jail. Every loser chose jail, so as to defraud the Company. It was from this initial bravado of a few men that the all-powerful position of the Company - its ecclesiastical, metaphysical strength - was derived." (17)





Laughter, humour and the science of pataphysics

"Only microfascism provides an answer to the global question: Why does desire desire its own repression, how can it desire its own repression?" Anti-Oedipus- Gilles Deleuze and Feliz Guattari (8)

There is an obvious connection between laughter and humour and the science of Pataphysics. To re-introduce and repeat pataphysics is: the science of imaginary solutions and in its most foundational level should be understood as a mechanism for using laughter as a tool for shattering systems of thought. Not purely as a nihilistic device but one that pursues goals of empowerment and enlightenment.

The text will utilise Anthony Enns' research which details the links and connections between Nietzsche's theory of laughter and the pataphysical sentiment and combines this dialogue with a conversation about the ability of art to address and pursue these concerns. Nietzsche's theory maintains that laughter can be used to expose underlying fictions which structure reality. In a similar way to aspects of Nietzsche's philosophical enquiries, Jarry attempts to use laughter as a way of criticising and resisting these fictions.

Within the essay 'On truth and falsity in an extramoral sense', Nietzsche outlines the importance of this impulse to expose and destabilise the illusions that construct themselves as 'truth' within the societal web:

"This impulse seeks for itself a new realm of action and another river bed, and finds it in… Art. This impulse constantly confuses the rubrics and cells of the idea, by putting new figures of speech, metaphors, metonymies; it constantly shows its passionate longing for shaping the existing world of waking man as motley, irregular, inconsequentially incoherent, attractive, and eternally new as the world of dream is." (9)

Nietzsche's ideas share an interest in the particular, the irregular and the incoherent. Pataphysics could be seen as a science of the particular and privileges the irregular and incoherent. Like the historical stream of conceptual artistic innovations, the Nietzscheian and pataphysical nexus pursues the desire for the intellect to be "no longer led by ideas but by intuitions". In this sense ideas refer to a generative, pre-existing and conditioning model.

'Thus Spake Zarathustra' (1883) contains Nietzsche's most detailed description of the forms of laughter. In this Nietzsche postulates an opposition between the laughter of the herd and the laughter of the height. The laughter of the herd refers to the most common form of laughter -- the laughter of mobs and crowds -- the majority against the minority. This manifested form of laughter is the old game of the odd one out. This process simultaneously attempts to harbour and generate a form of control for itself by extracting power through ridicule. This exists through playing out a prescriptive game; a form of collective social crystallisation (on whatever scale) of a certain viewpoint or judgement towards a targeted exclusion of those who differ from this ideal. It becomes a group effort to control and subdue those who don't conform to society's command structure. (10)

It may be said that this incessant desire no longer operates by conscious devices but perhaps is a manifestation of a grander social algorithm -- part of a larger sorting process humans exist within, which utilises this aural expression (laughter) as a tool for reinstating and inscribing pre-existing social conditions of status, power and hierarchy.

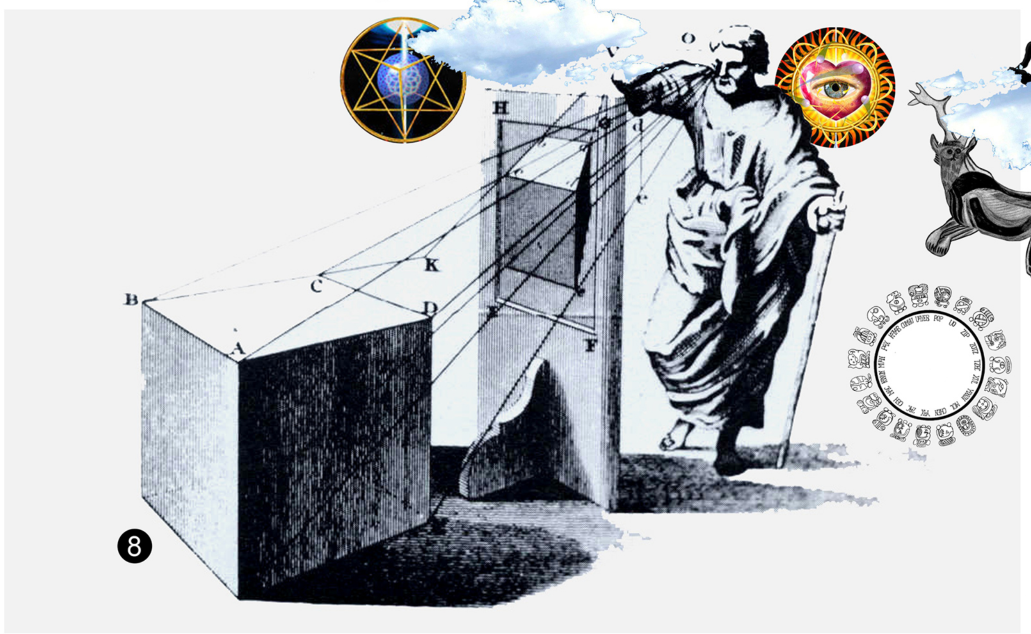
The concept of the laughter of the height in this model would operate on similar lines. This operation exists as another aspect of the social sorting process, a series of movements within a deeper (human and material) structure playing itself out. It just happens to be the exception (however necessary in a grand sense) to the (more) common impulses of the body politic. This impulse is necessary in the sense that without this dissociation from 'the norm' new paradigms of thought would not emerge.

In contrast to the laughter of the herd which is concerned with scorn and ridicule, the laughter of the height is associated with freedom and transcendence. Enns claims that the laughter of the height involves the important element of laughing at one's own existence. Utilising John Lippet's analysis of 'Thus spake Zarathustra', Enns' constructs a postulation of laughter of the height as "the person who attains the height to laugh at all tragedy, real or imaginary, from this vantage point, there is nothing that cannot be amusing and the ultimate joke is life itself". (11) Enns through Lippet concludes that Nietzsche's laughter of the height "...is an affirmation of suffering and by the virtue of laughter-higher men have a greater perspective on this position". (12)

Going beyond Lippet however, Enns adds that the constant use of metaphor in reference to height, distance and perspective in Nietzsche's writing illustrates a deeper awareness "of the fictions which structure one's perception of reality". (13) Nietzsche's theory of laughter for Enns is situated on "learning to laugh beyond yourself", (14) using the notion of height and its potential to move beyond oneself to "look down upon oneself" from above, which allows one to "see the ground and background of all things". (15)

Technology : Questions concerning

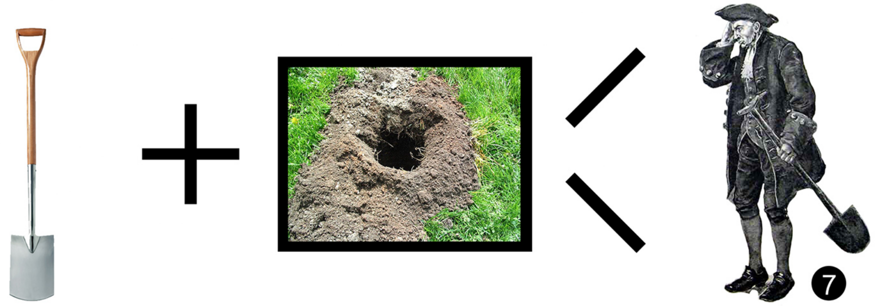
Martin Heidegger's 'The Question Concerning Technology' is an expanded essay on the topic. Written some 50 years ago, it still remains an illustrative text in describing underlying processes inherent within our collective relationship with technology. As my project in general is a grand accumulation, re-appropriation, disorganisation or conjoined mutation of models it seems natural that a key text outlining this dynamic, in its most foundational way, seems of value. For the purpose of this project, this article will utilise a number of key concepts which form the basis for Heidegger's essay, exploring the implicit processes these terms and definitions allude to. These are enframing, standing-reserve and techne.


⑧

For Heidegger the world and being within this, first and foremost is primarily defined by a 'revealing'. The Greeks have the word aletheia for 'revealing'. The Romans translate this with veritas. We say 'truth' and usually understand it as correctness of representation. (19) This 'revealing' is what Heidegger sees as truth. It embraces more than just knowledge; it embraces all the ways in which we can relate to the things of the world. Humans are not just pure knowers. Part of Heidegger's insight is that what constitutes truth has been limited in the history of the Western world. Generally truth is thought to be limited to knowledge, to facts about the world. He does not claim that scientific knowledge is not true, as it too is indeed a mode of revealing; but that it is not the only truth and it should not have the monopoly on truth.

Techne

For the Greeks, techne was a more expanded version of the word 'technology' we use today. While it shared all the characteristics of our definition, it also understood other more subtle reciprocity between humans and the technological instruments that had manifested. "The essence of technology is nothing technological." (18) With this statement Heidegger begins to outline what these differences are, and how our general modern understanding is inadequate in defining the complex causality shared with the internal logic of technology.

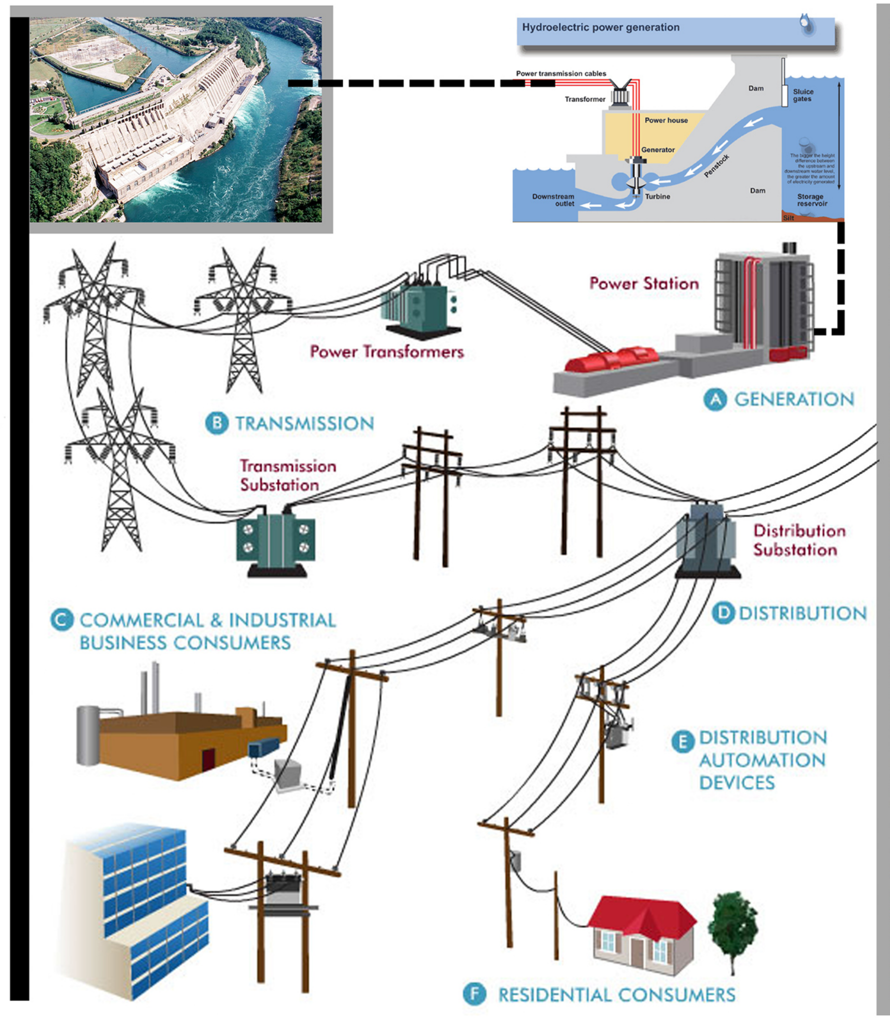

⑦

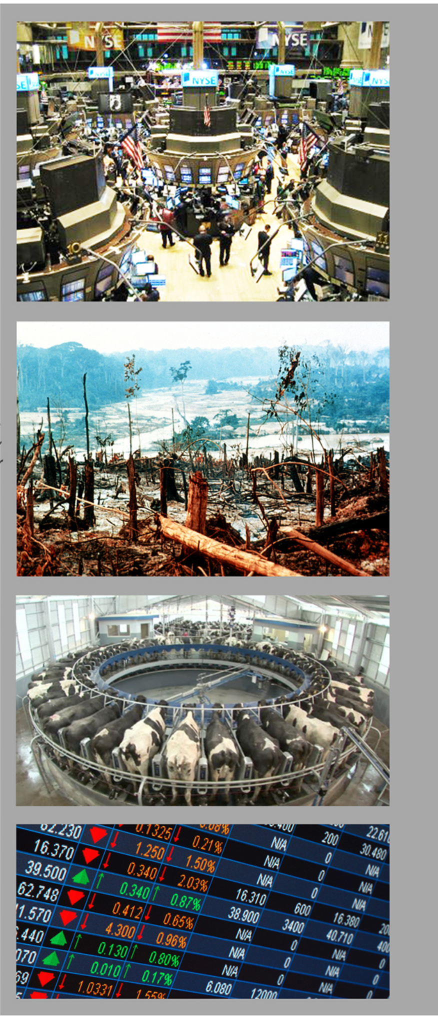
Moving away from the simplistic (modern understanding) that sees technology operating on these two levels -- one being technology is a means to an ends (instrumental) and the other that technology is a human activity (anthropological) -- Heidegger offers, through etymology, an understanding of technology in a less reductive framework. This definition encompasses a more active role as a shaper; a way of bringing forth or revealing the world to the human subject.

Techne's variation with its modern equivalent, according to Heidegger, is in its consciousness and understanding of how it alters the world to appear; appear as opposed to 'Is'. The modern technological circuit is in a process of defining what 'Is'. Slowly eroding the vast 'potentiality' of the world to appear to a subjectivity in many forms and guises, replacing it with a form of certainty in its models and frameworks.

Enframing and Standing-reserve

Heidegger uses the term enframing to explain the way humans, as users of modern technology, have come to relate to (and literally frame) the world. In Heidegger's focus on 'being', modern technology displaces the worldliness of the world. He sees modern technology as inherently working in this process of creating a circuit within the quantifiable material world, continually sorting and storing the world into resources the system can command for use at a future point. Heidegger compares the hydro power plant and the windmill to explain this process.

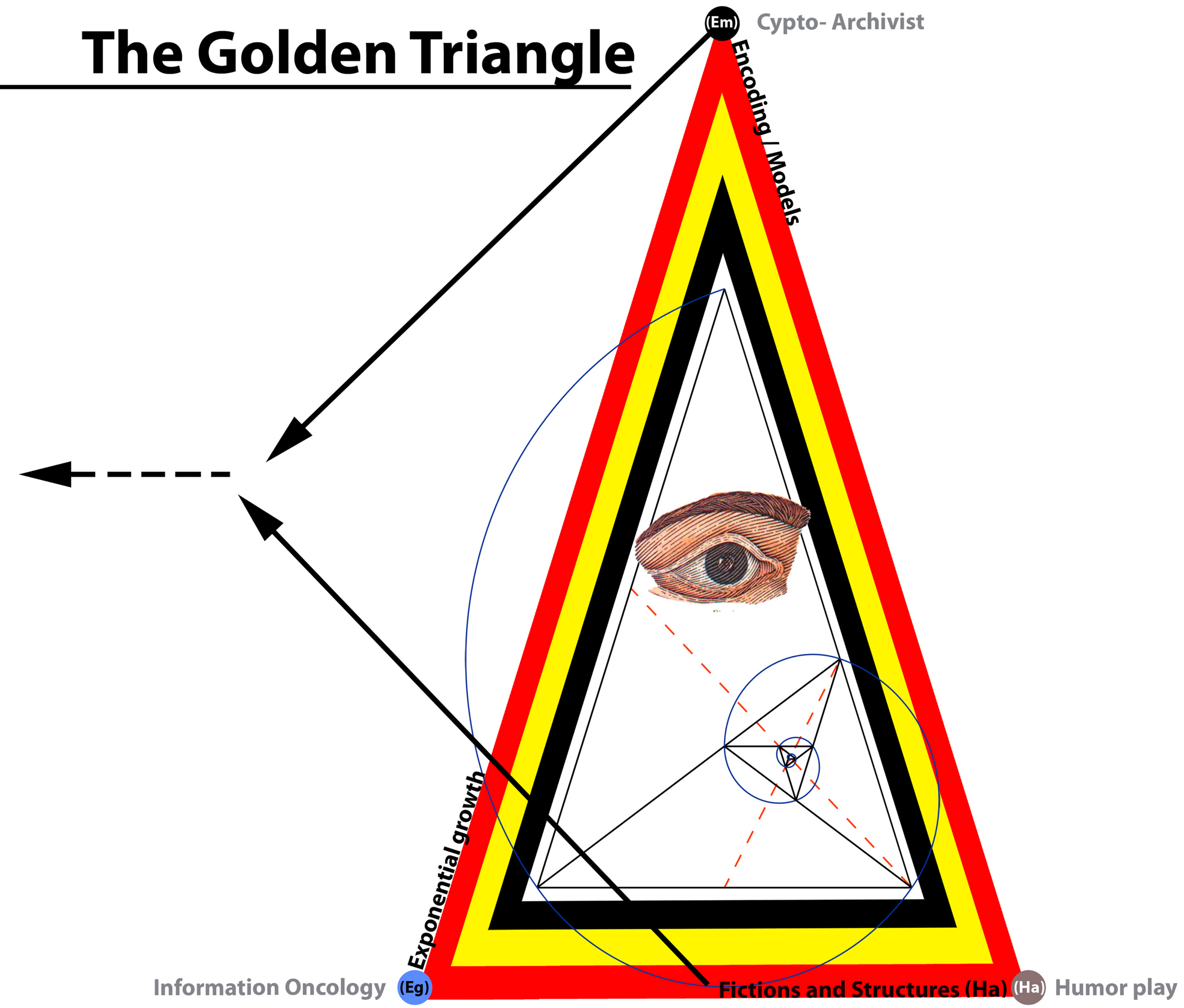


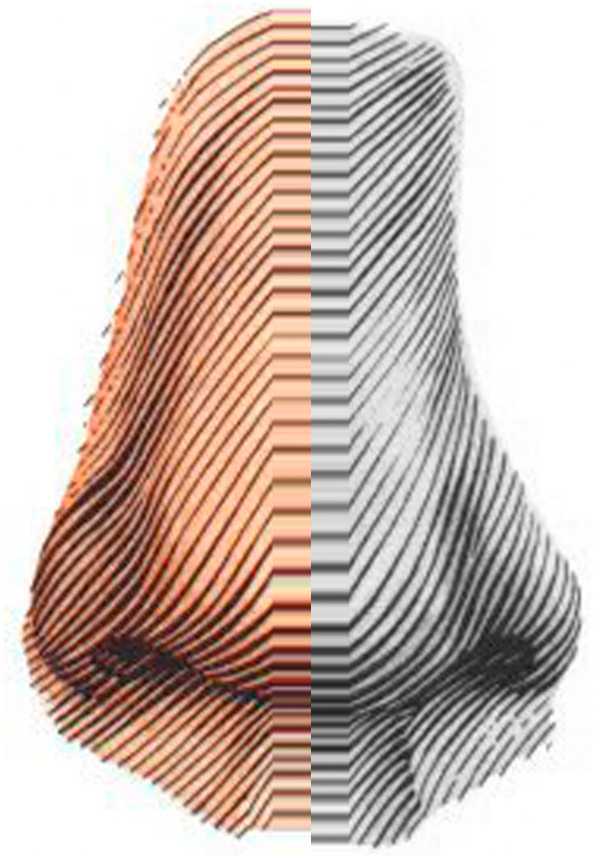


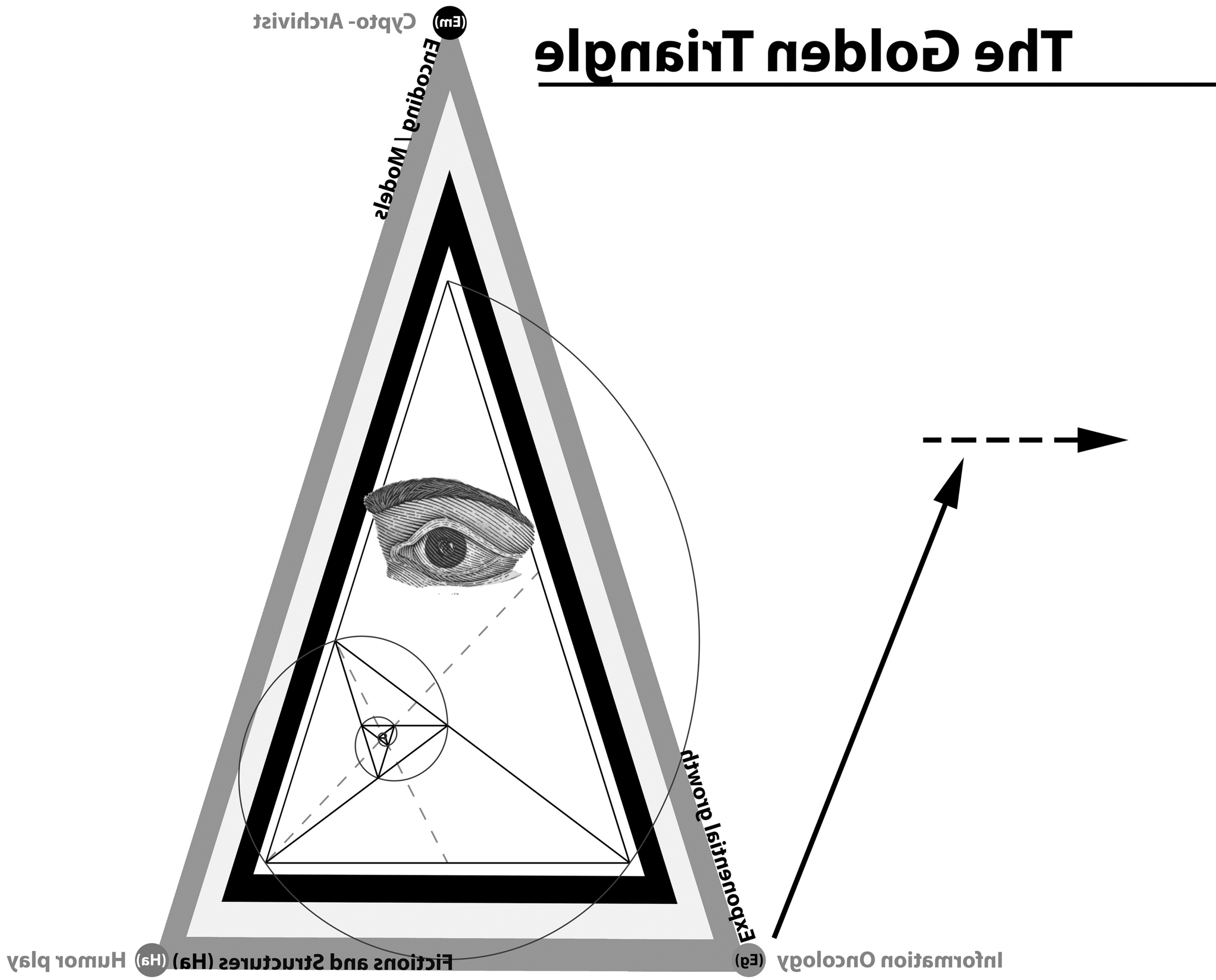
The windmill differs from the type of revealing that characterises modern technology. With the windmill, the wind turns the turbines; the wind energy instantaneously powers the turbines. At no point is the wind's energy manipulated or stored up as a different kind of energy. On the other hand, the hydro plant works in a different way as a producer of energy. Using the specific example of the Rhine River, Heidegger describes a form of control it commands over the river. Its cycles are set to the current of the dammed river, using it to supply its hydraulic pressure which sets the turbines turning; it's these dynamics which set up a vast interconnected set of processes, fusing cables, grids and power stations. The final product, as this unlocked energy becomes manifest, is a stored reserve of the resource, stockpiled for the system to utilise when considered necessary. This forms the basis for Heidegger's idea of standing reserve. The vast circuitry of technology that currently dominates the world could be understood as an advanced stage of this process. The playing out of a form of logic that according to Heidegger:

…Happens in that the energy concealed in nature is unlocked, what is unlocked is transformed, what is transformed is stored up, what is stored up is, in turn, distributed, and what is distributed is switched about ever anew. Unlocking, transforming, storing, distributing, and switching about are ways of revealing. But the revealing never simply comes to an end. (20)

The Golden Triangle

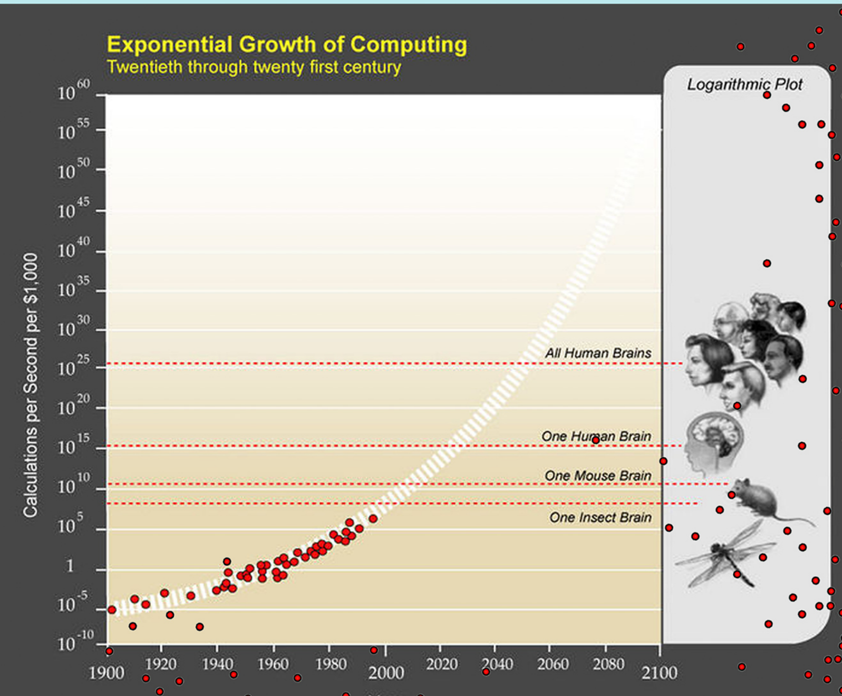


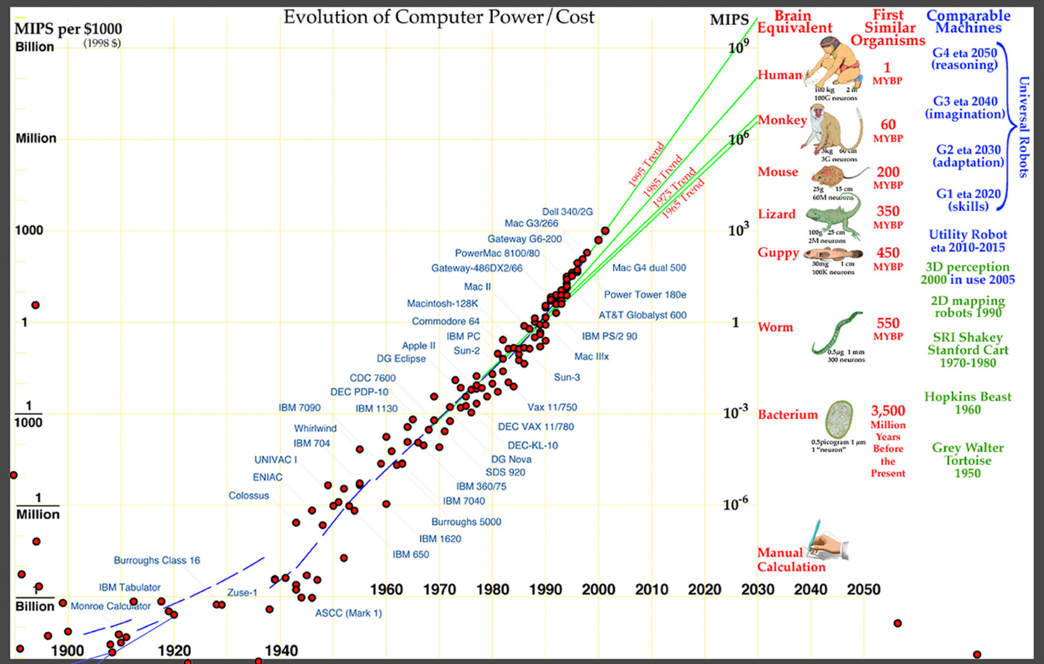




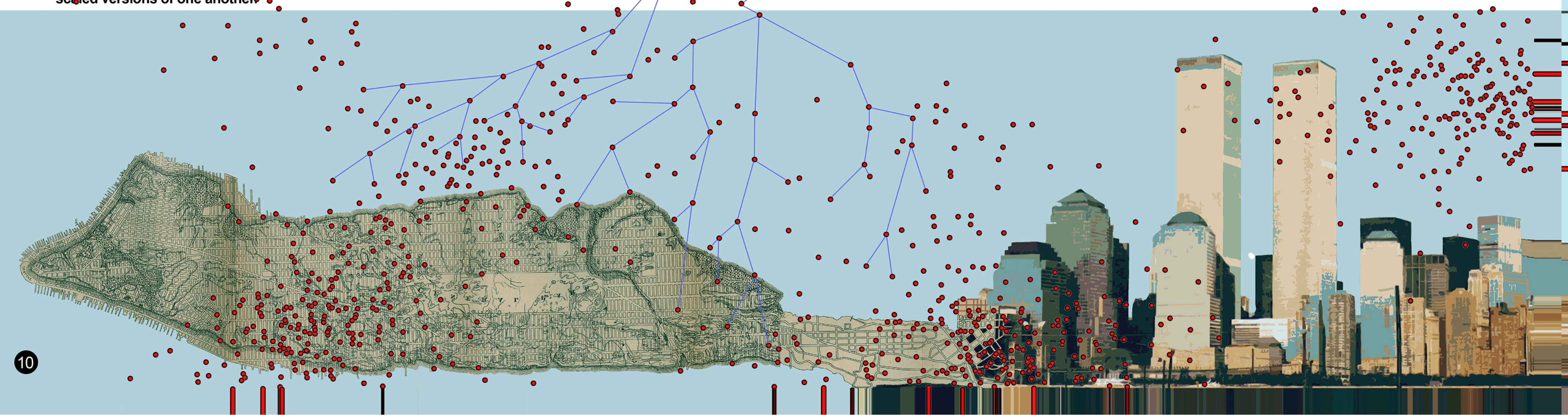
The nature of exponential growth

In 1965, Intel co-founder Gordon Moore sat down and gave mathematical form to one of the most intriguing and simple formulas for defining technological advances. Labelled ‘Moore’s Law’ (21), it is based on the explanation that roughly every two years the speed of computer processing doubles while simultaneously decreasing in transistor size. Since its creation, Moore’s Law has predicted this reality to almost complete accuracy. While it could be argued that this 'rule' has evolved from its early predictions to become a self-fulfilling prophecy of an industry racing to reach the target before its competitors, it just so happens that this 'law' can also be utilised to map other forms of technology and their evolution.





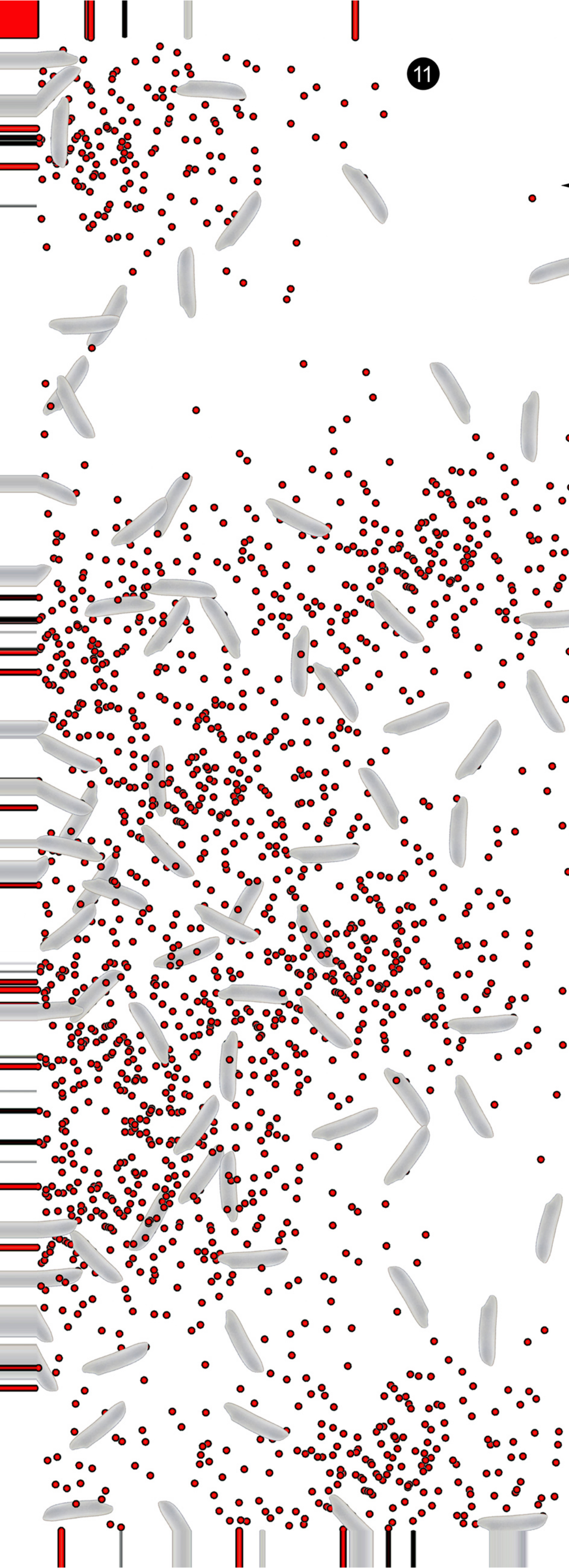
For example, recent research headed by Geoffrey West, President and Professor of the Santa Fe Institute in America, has found that city growth and structure work in a similar way. Charting the common underlying dynamics, beyond the obvious superficial characteristics, research results show a universal behaviour that can be seen from China to Europe to the USA. On average, the dynamics of the cities researched are scaled versions of one another.



Drawing on insights from research in biology which revealed the extraordinary similarity in the structure, organisation and dynamics of organisms of vastly different sizes, from cells to ecosystems, the team analysed a large number of global urban centres and charted economic productivity, innovation, demographics, crime, public health, infrastructure and patterns of human behaviour. They found that all these variables follow simple statistical scaling relating to population, with predictable changes from small cities to the largest megalopolis.

On a behavioural level, cities become social accelerators where both the positive (innovative) aspects and negative (crime and certain diseases) aspects seem to increase predictably in the same proportion as cities become larger. On average, people actually do walk on average faster in larger cities, whereas heart rates decrease as animal size increases. With the city, it seems, mankind has created an "organism" operating beyond the bounds of biology. (22)

As West said, “In this crucial sense cities are completely different from biological organisms, which slow down with size; their relative metabolism, growth rates, heart rates, and even rates of innovation — their evolutionary rates — systematically, and predictably, decrease with organism size.” (23) The research showed that city growth driven by wealth creation increases at a rate that is faster than exponential, the only way to deal with potential collapse as the population outstrips its resources is through constant cycles of innovation. The larger the population, the lower return on each new innovation, so new ideas have to come faster and faster, thus the city gets bigger, life faster, which in turn has to continue to increase to sustain the development, always existing in a process of re-engineering the initial conditions.



In a more contemporary and expanded context Ray Kurzweil *, ‘The laws of accelerating returns’ (1999) attempts to legitimatise as a serious scientific endeavour, the sentiment of Moore's thinking and how it may play itself out in the future. Kurzweil brings in the mapping of the genome with other recent advancement in computers as well as a more historical long term analysis of technological developments to make his point clear; technology advances at an exponential rate. This may appear not to mean much or be no big deal, it depends on where you position yourself within this change and this is something that is not lost on Kurzweil as he is fond of quoting the story of the inventor of chess and his patron the emperor of China to make his point.

Delighted with his new beloved game the emperor asked the inventor to name his reward, thinking quickly he asked for a single grain of rice on the first square, two on the second square, four on the third, and so on across the whole board. The Emperor promptly granted this seemingly benign and humble request. The first half of the board was fairly uneventful; initially he was given spoonfuls of rice, then bowls, then barrels. By the end of the first half of the chess board, the inventor had accumulated one large field's worth (4 billion grains), and the emperor started to take notice. It was as they proceeded through the second half of the chessboard that the situation quickly deteriorated, one version of the story has the emperor going bankrupt as the final total of 63 doublings requires rice fields covering twice the surface area of the Earth, oceans included. Another version of the story has the inventor losing his head. (26)

Incidentally, with regard to computation power (the keystone to our present technological progression) there have been slightly more than 32 doublings of performance since the first programmable computers were invented nearly 70 years ago. In other words, we stand today roughly at the middle of the chess board.

What Kurzweil is describing is the strangely counter intuitive logic the majority of us don’t seem to consider when thinking about the force of technology and its growth patterns, that is, that technology progresses in an exponential way as opposed to the normal intuitive linear view we tend to think of it. (I.e. the amount of change I’ve experienced in the recent past will dictate the amount of change to be seen in the future.) Opposed to this, and in consideration of what happens when powerful technologies effect the rapid development of other technologies, Kurzweils predicts in the 21st century will we see not a hundred years of progress but more like 20,000 years of progress (at today's rate.)

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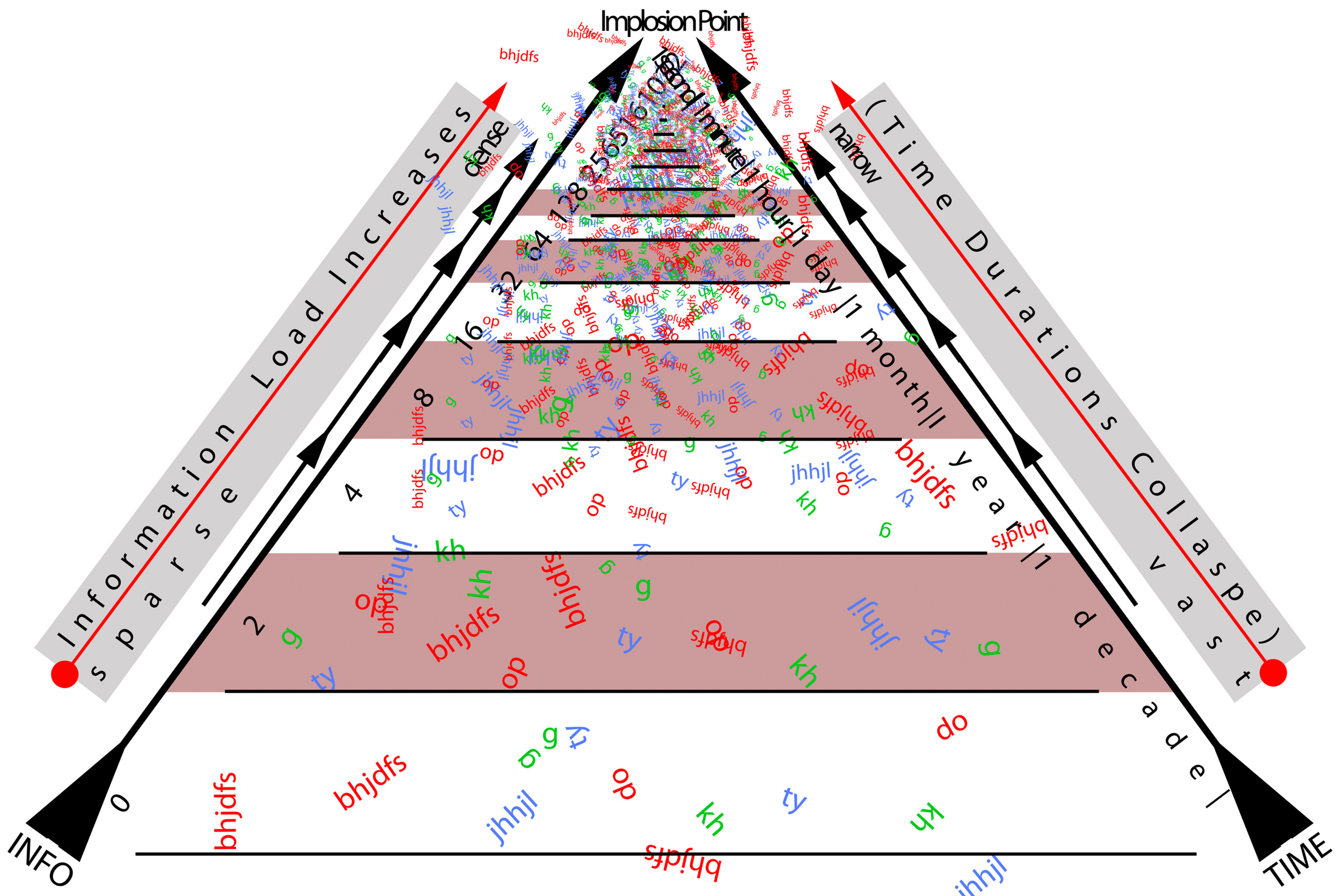
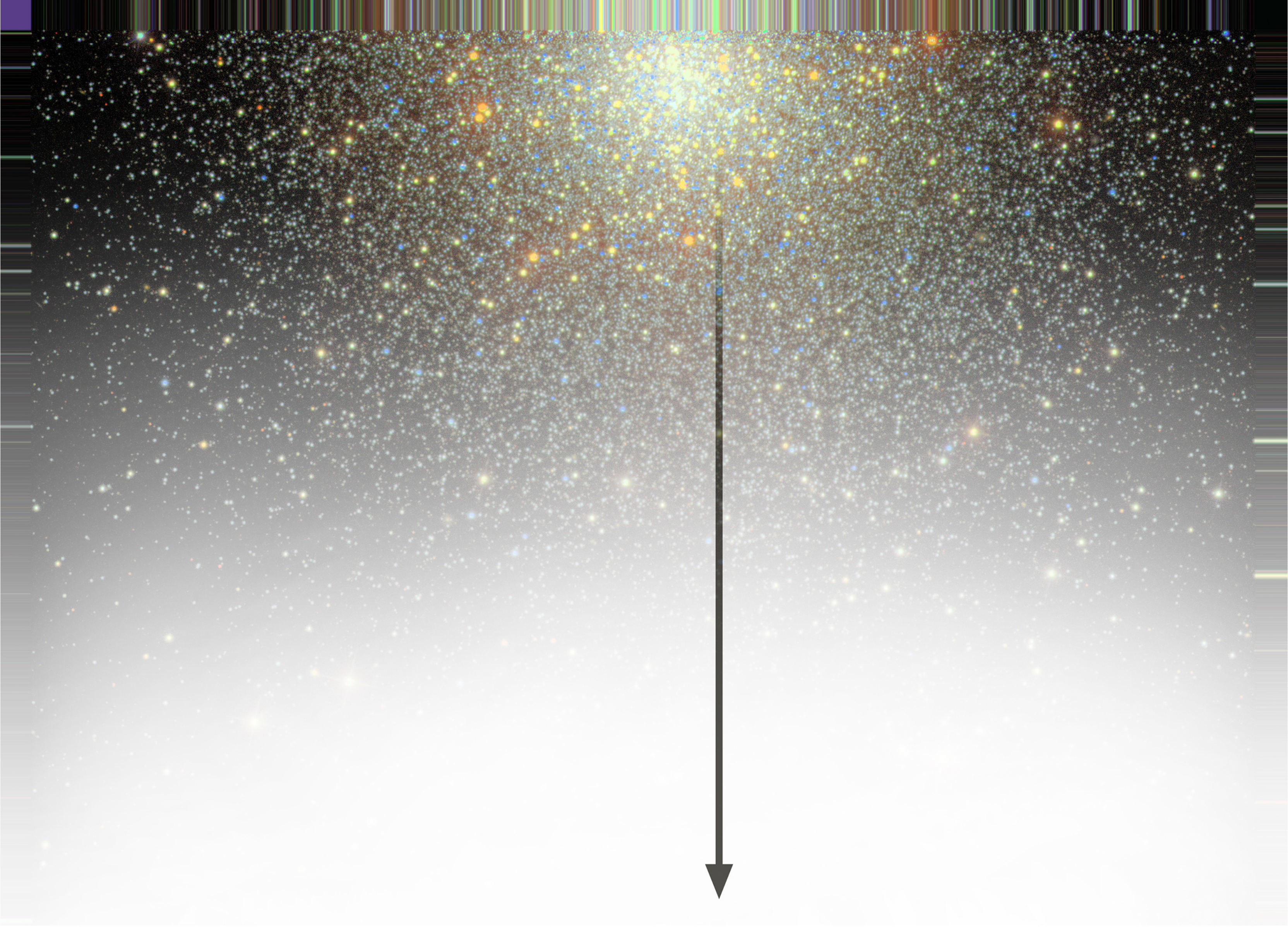
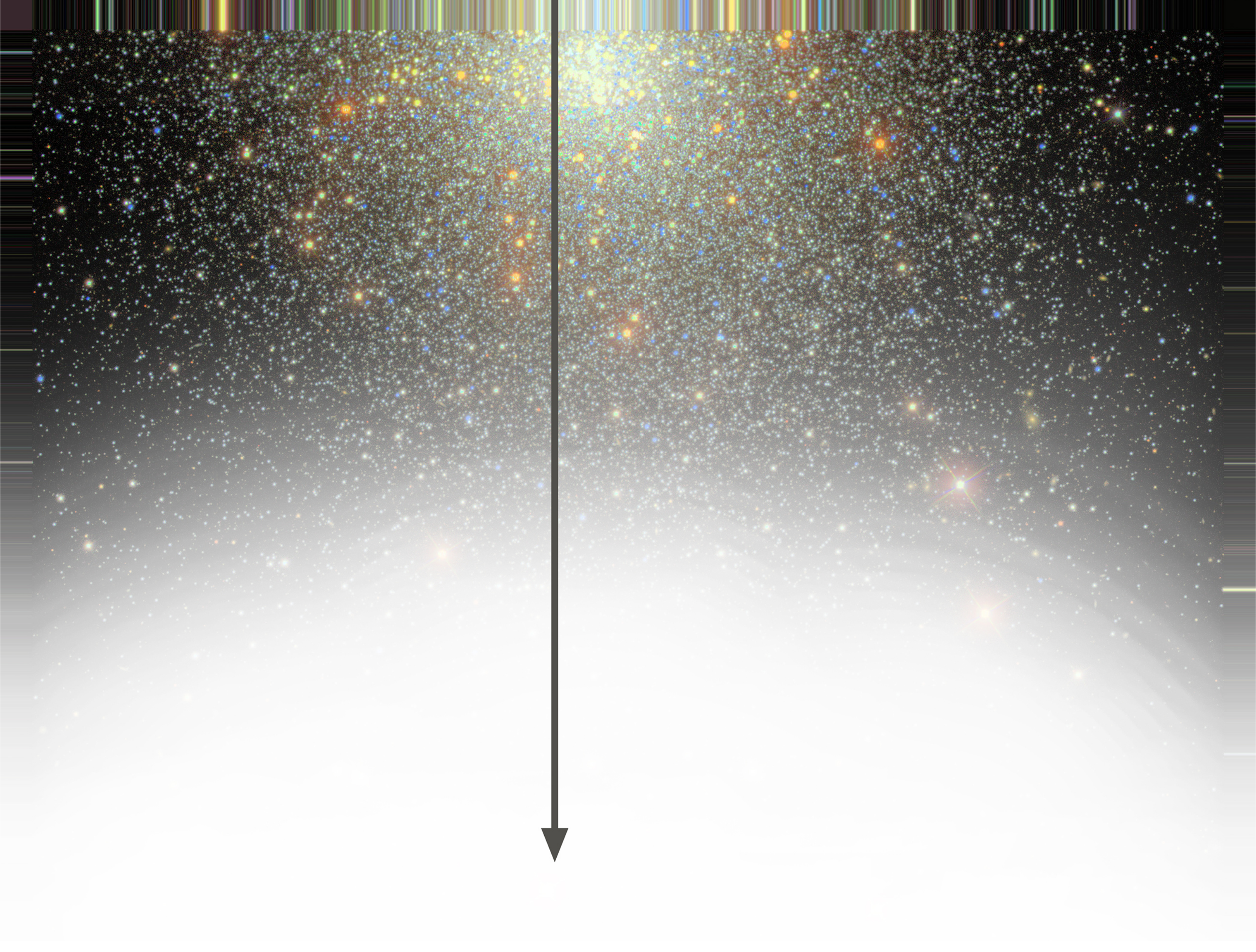
* As one of the leading inventors of our time, Ray Kurweil was the principal developer of the first CCD flat-bed scanner, the first omni-font optical character recognition, the first print-to-speech reading machine for the blind, the first text-to-speech synthesizer, the first music synthesizer capable of recreating the grand piano and other orchestral instruments, and the first commercially marketed large-vocabulary speech recognition
Among Ray’s many honours, he is the recipient of the $500,000 MIT-Lemelson Prize, the world’s largest for innovation. In 1999, he received the National Medal of Technology, the nation's highest honor in technology, from President Clinton in a White House ceremony. And in 2002, he was inducted into the National Inventor's Hall of Fame , established by the US Patent Office. He has received nineteen honorary Doctorates and honours from three U.S. presidents. Ray has written six books, four of which have been national best sellers. (25)

Techno Time vs Information



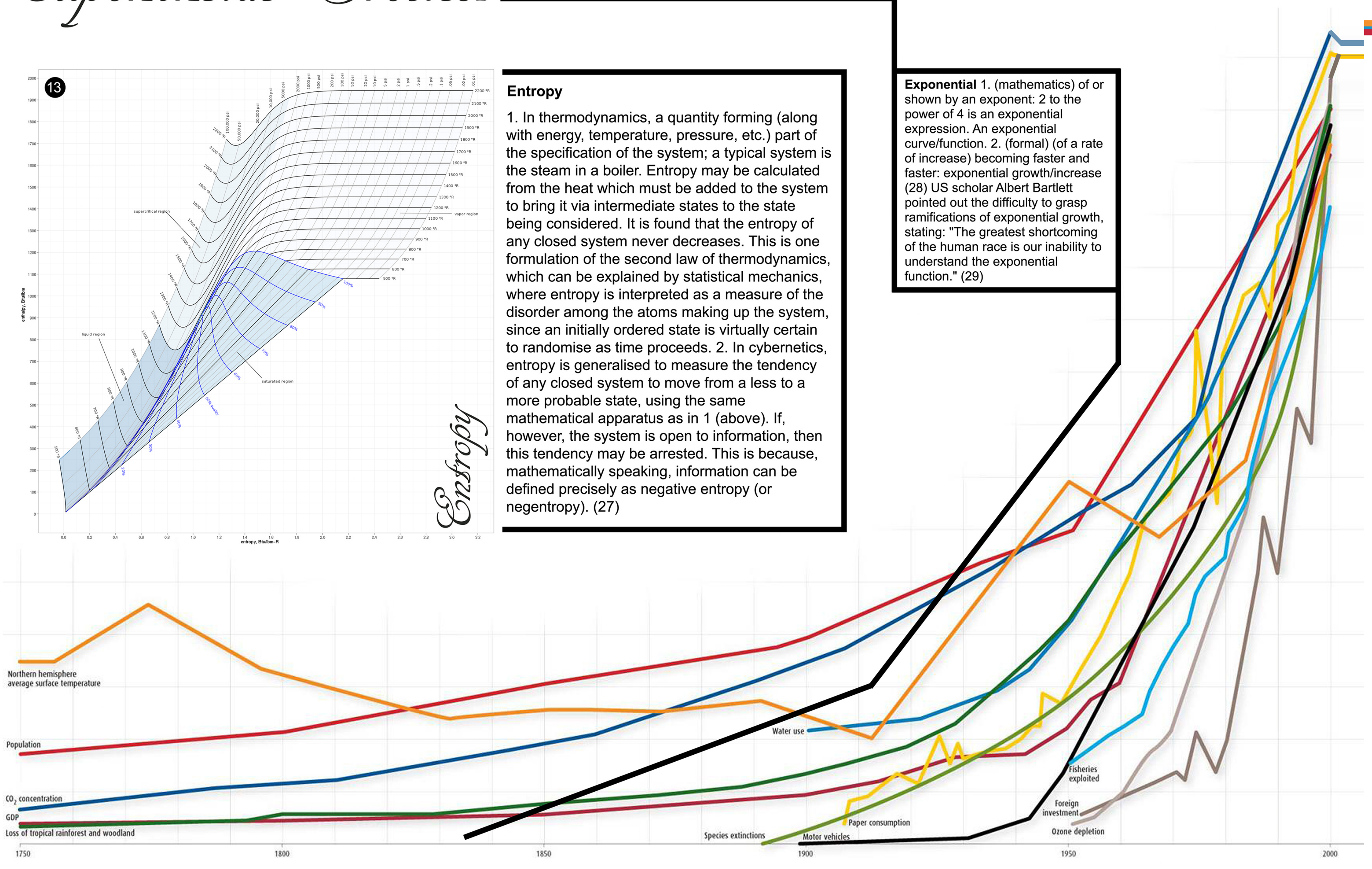


expansion point



expansion point

Exponential Growth

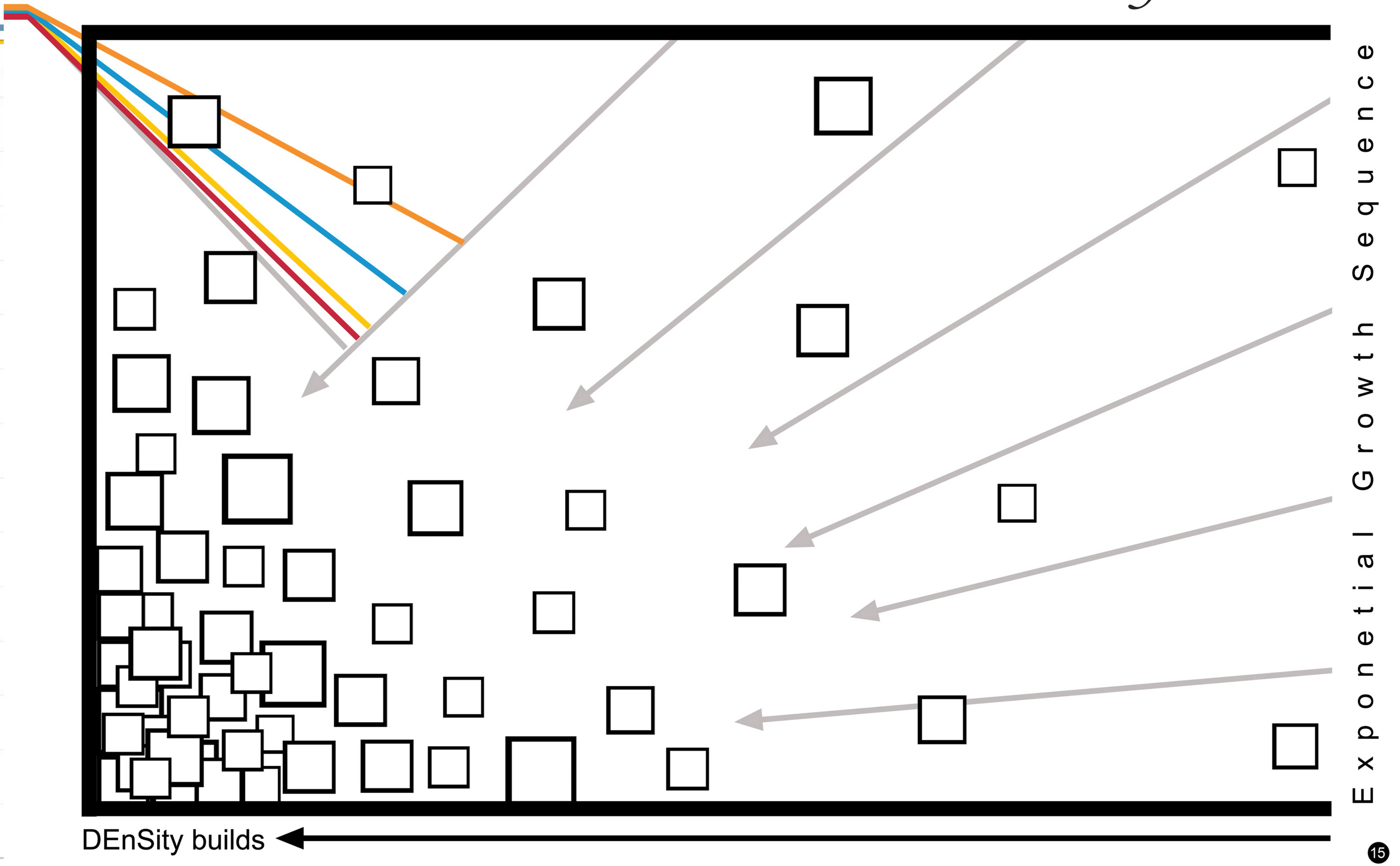


Entropy

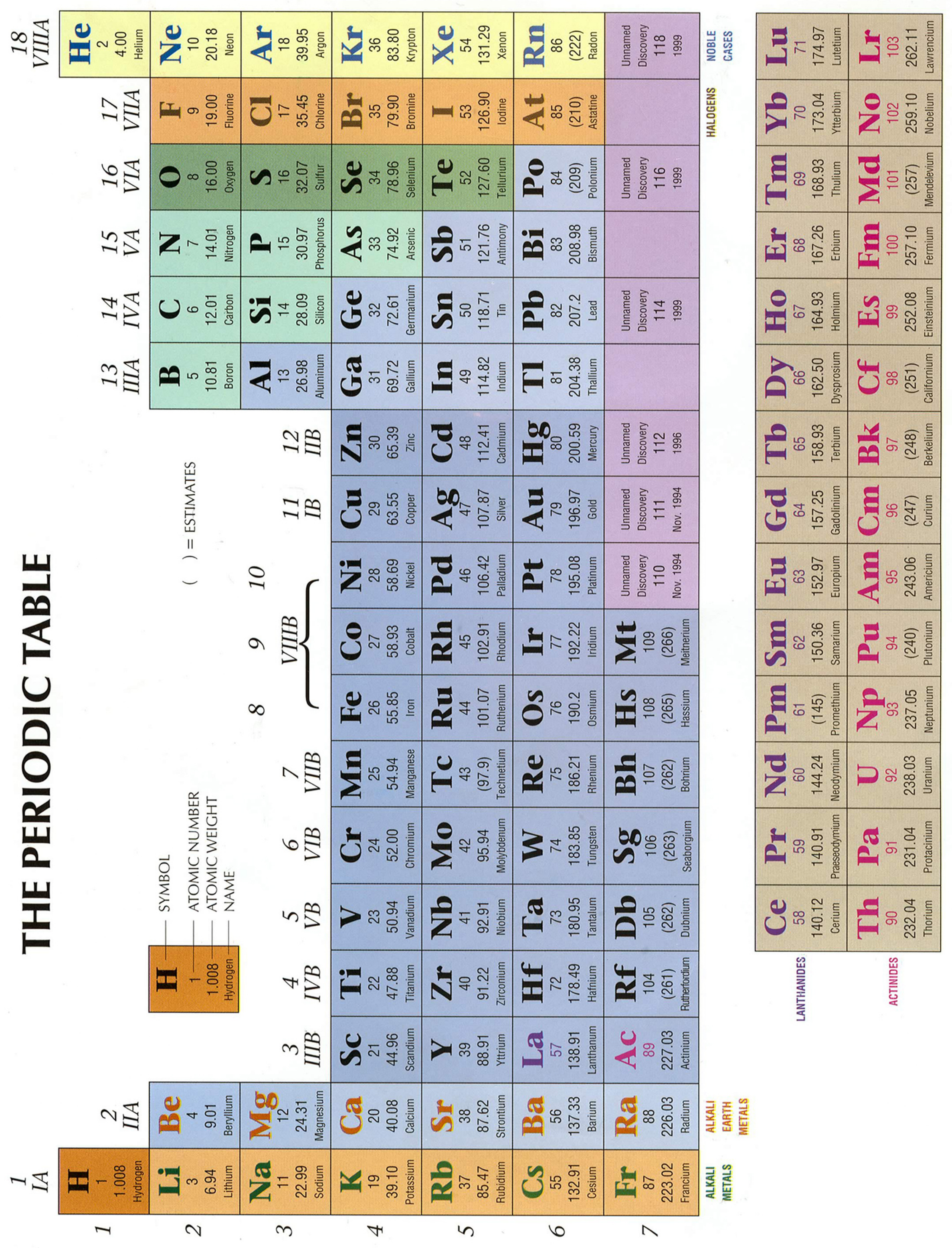
1. In thermodynamics, a quantity forming (along with energy, temperature, pressure, etc.) part of the specification of the system; a typical system is the steam in a boiler. Entropy may be calculated from the heat which must be added to the system to bring it via intermediate states to the state being considered. It is found that the entropy of any closed system never decreases. This is one formulation of the second law of thermodynamics, which can be explained by statistical mechanics, where entropy is interpreted as a measure of the disorder among the atoms making up the system, since an initially ordered state is virtually certain to randomise as time proceeds. 2. In cybernetics, entropy is generalised to measure the tendency of any closed system to move from a less to a more probable state, using the same mathematical apparatus as in 1 (above). If, however, the system is open to information, then this tendency may be arrested. This is because, mathematically speaking, information can be defined precisely as negative entropy (or negentropy). (27)

Exponential 1. (mathematics) of or shown by an exponent: 2 to the power of 4 is an exponential expression. An exponential curve/function. 2. (formal) (of a rate of increase) becoming faster and faster: exponential growth/increase (28) US scholar Albert Bartlett pointed out the difficulty to grasp ramifications of exponential growth, stating: "The greatest shortcoming of the human race is our inability to understand the exponential function." (29)

Gallery Plan



THE PERIODIC TABLE



SYMBOL
ATOMIC NUMBER
ATOMIC WEIGHT
NAME

( ) = ESTIMATES

	1 IA	2 IIA	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIIIB	9	10	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1	H 1 1.008 Hydrogen																	He 2 4.00 Helium
2	Li 3 6.94 Lithium	Be 4 9.01 Beryllium											B 5 10.81 Boron	C 6 12.01 Carbon	N 7 14.01 Nitrogen	O 8 16.00 Oxygen	F 9 19.00 Fluorine	Ne 10 20.18 Neon
3	Na 11 22.99 Sodium	Mg 12 24.31 Magnesium											Al 13 26.98 Aluminum	Si 14 28.09 Silicon	P 15 30.97 Phosphorus	S 16 32.07 Sulfur	Cl 17 35.45 Chlorine	Ar 18 39.95 Argon
4	K 19 39.10 Potassium	Ca 20 40.08 Calcium	Sc 21 44.96 Scandium	Ti 22 47.88 Titanium	V 23 50.94 Vanadium	Cr 24 52.00 Chromium	Mn 25 54.94 Manganese	Fe 26 55.85 Iron	Co 27 58.93 Cobalt	Ni 28 58.69 Nickel	Cu 29 63.55 Copper	Zn 30 65.39 Zinc	Ga 31 69.72 Gallium	Ge 32 72.61 Germanium	As 33 74.92 Arsenic	Se 34 78.96 Selenium	Br 35 79.90 Bromine	Kr 36 83.80 Krypton
5	Rb 37 85.47 Rubidium	Sr 38 87.62 Strontium	Y 39 88.91 Yttrium	Zr 40 91.22 Zirconium	Nb 41 92.91 Niobium	Mo 42 95.94 Molybdenum	Tc 43 (97.9) Technetium	Ru 44 101.07 Ruthenium	Rh 45 102.91 Rhodium	Pd 46 106.42 Palladium	Ag 47 107.87 Silver	Cd 48 112.41 Cadmium	In 49 114.82 Indium	Sn 50 118.71 Tin	Sb 51 121.76 Antimony	Te 52 127.60 Tellurium	I 53 126.90 Iodine	Xe 54 131.29 Xenon
6	Cs 55 132.91 Cesium	Ba 56 137.33 Barium	La 57 138.91 Lanthanum	Hf 72 178.49 Hafnium	Ta 73 180.95 Tantalum	W 74 183.85 Tungsten	Re 75 186.21 Rhenium	Os 76 190.2 Osmium	Ir 77 192.22 Iridium	Pt 78 195.08 Platinum	Au 79 196.97 Gold	Hg 80 200.59 Mercury	Tl 81 204.38 Thallium	Pb 82 207.2 Lead	Bi 83 208.98 Bismuth	Po 84 (209) Polonium	At 85 (210) Astatine	Rn 86 (222) Radon
7	Fr 87 223.02 Francium	Ra 88 226.03 Radium	Ac 89 227.03 Actinium	Rf 104 (261) Rutherfordium	Db 105 (262) Dubnium	Sg 106 (263) Seaborgium	Bh 107 (262) Bohrium	Hs 108 (265) Hassium	Mt 109 (266) Meitnerium	Unnamed Discovery 110 Nov. 1994	Unnamed Discovery 111 Nov. 1994	Unnamed Discovery 112 1996		Unnamed Discovery 114 1999		Unnamed Discovery 116 1999		Unnamed Discovery 118 1999
	ALKALI METALS	ALKALI EARTH METALS															HALOGENS	NOBLE GASES

LANTHANIDES	Ce 58 140.12 Cerium	Pr 59 140.91 Praseodymium	Nd 60 144.24 Neodymium	Pm 61 (145) Promethium	Sm 62 150.36 Samarium	Eu 63 152.97 Europium	Gd 64 157.25 Gadolinium	Tb 65 158.93 Terbium	Dy 66 162.50 Dysprosium	Ho 67 164.93 Holmium	Er 68 167.26 Erbium	Tm 69 168.93 Thulium	Yb 70 173.04 Ytterbium	Lu 71 174.97 Lutetium
ACTINIDES	Th 90 232.04 Thorium	Pa 91 231.04 Protacinium	U 92 238.03 Uranium	Np 93 237.05 Neptunium	Pu 94 (240) Plutonium	Am 95 243.06 Americium	Cm 96 (247) Curium	Bk 97 (248) Berkelium	Cf 98 (251) Californium	Es 99 252.08 Einsteinium	Fm 100 257.10 Fermium	Md 101 (257) Mendelevium	No 102 259.10 Nobelium	Lr 103 262.11 Lawrencium

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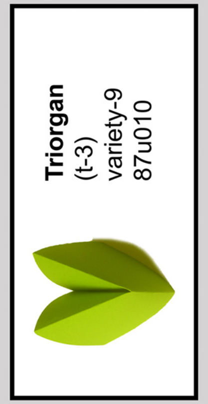
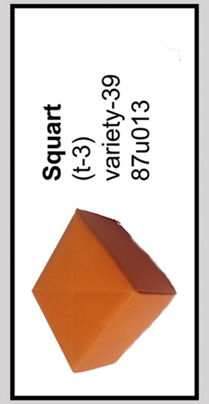
Paper index Indicators (PI.)



Triorgan
(t-3)
variety-9
87u010



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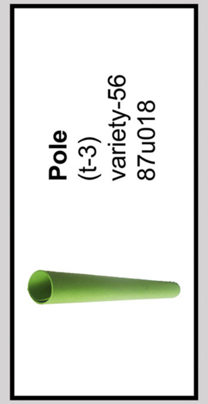
variety-39
87u013

Scrunch
(t-3)
variety-27
87u016



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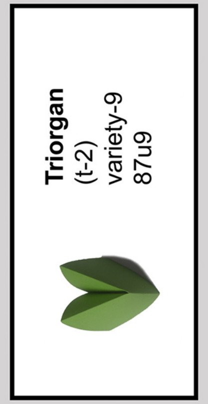
variety-56
87u018



Triorgan
(t-2)
variety-9
87u9

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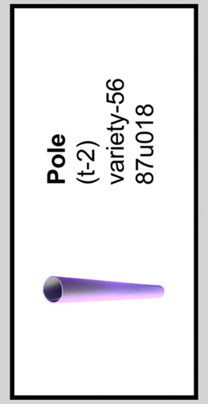
variety-39
87u012

Scrunch
(t-2)
variety-27
87u015



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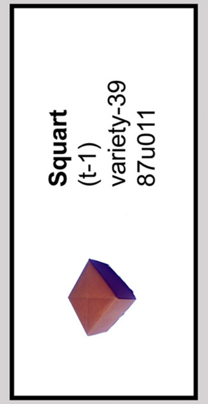
(t-2)
variety-56
87u018

Triorgan
(t-1)
variety-9
87u8



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Scrunch
(t-1)
variety-27
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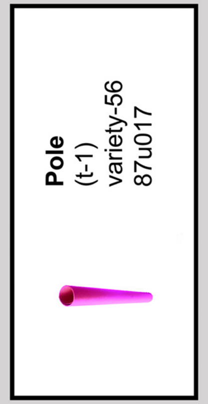


Pole
(t-1)
variety-56
87u017

Developmental Property Indicators (D.P.I)

Ardcerd (ad)
<(F)>
2.76
de- 7.9/0
*

Pedrapre (pd)
<(A)>
757.4
gh- 17.4/9/78
****

Etablcrack (et)
<(G)>
825.8
pl- 7.4/9
****

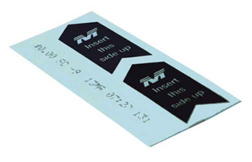
Luebcup (Lp)
<(A)>
7.6
fv- 2.3/0/7
**

Cedi (di)
<(D)>
45.68
ma- 9.9/09
*****

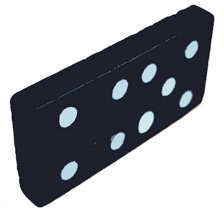
Kobolueb (ko)
<(E)>
15.26
kl- 5.9/6
**

Ayrscpan (ay)
<(A)>
04.93
rh- 4/78/9
*****

Oxbodard (ox)
<(F)>
127.83
ph- 5/6.8
*



Kesubcitt (ox)
<(B)>
7.853
kl- 3.4/9
***

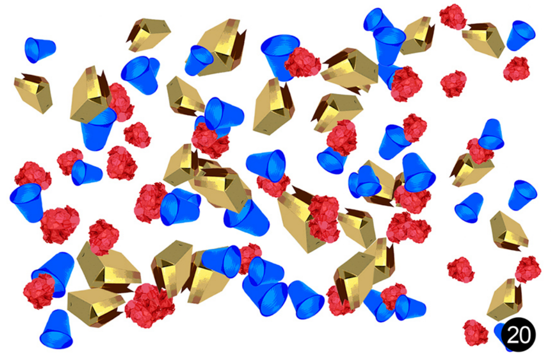


Omindo (om)
<(K)>
45.8
fb- 3.4/8
***

Rheysogt (rh)
<(B)>
903.53
qr- 6/9.92
****

Alberplap (ab)
<(E)>
375.87
cd- 45.9/8/7
****


19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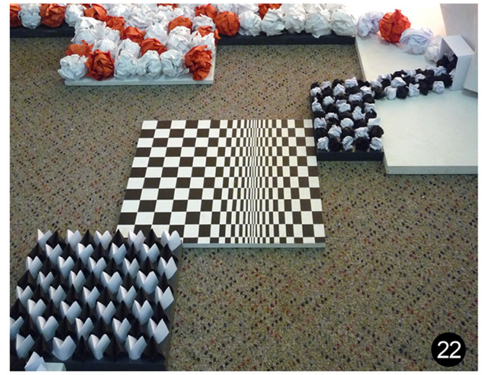
21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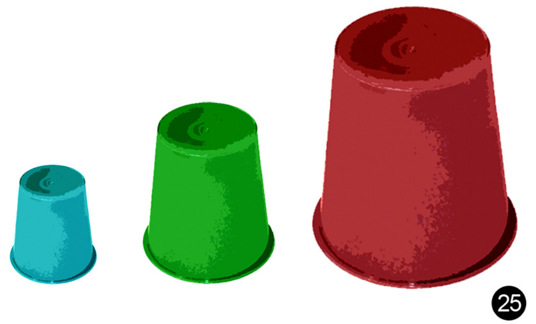
23


24


25


26

Chance / Rules

start

The main visual motifs (or visual elements) that have been created and constitute the construction of each system (or part) that makes up the greater whole are derived from selection criteria. These criteria could be best described as echoing systems of modern efficiency. These distinctions are implicit to the modern world and exist as a series of 'potentials' which exist within the objects that are imbued with these purposes and roles.

economic $ (price per unit)

These distinctions are ingrained in the functioning of current global systems. Other dynamics such as speed, ubiquity, density and interconnectedness help to generate a more thorough image of the potentials that exist within the material world. These dynamics are expressed through the dominant forms shaping our constructed environment. The criterion outlined in this section focuses on the units (the building blocks) that form the foundation for the rest of these systems.

Modular

This foundation is also implicit within the artwork as much as the technological world it mirrors. The criteria have been reduced to eight points of central concern for judging and hence encoding what essentially are everyday mundane materials. This process of encoding through these distinctions and simultaneous organisation into the systematic logic of the chart (akin to the table of elements) converts these somewhat random objects into a form of archive.

The Grid

Form

In a sense, the total project can be understood as existing within this archival logic. Utilising the definition of archive as 'any extensive record or collection of data', the random collection of objects now become data (rotating) within a system of objects the project creates for itself. The chart titled D.P.I or developmental property indicators (overleaf) is an example of the tables created for the project.

Availability

Not all the objects rate the same in relation to the various criteria outlined, but much like guiding formulas of the larger world they emerge from, find a balance that best suits the processing they're utilised for. The criteria are as follows: Chance & Rules, Form, The Grid, Economic $ (price per unit) — ability to expand, Structural Potential — ability to build, Scale Variations, Modular and Availability.

Scale (Variation)

Other factors exist on the periphery from the central criteria. These are colour and materiality, connotations toward consumption, and the act of encoding. The connection to consumption relate simultaneously to collective appetite of the technological system and the individual drives which produce this.

finish

Structural Variation (Potential)

systems of modern efficiency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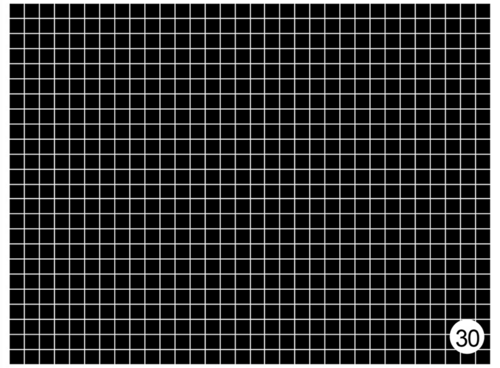
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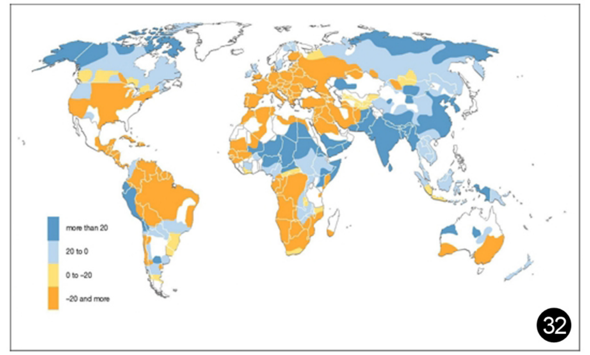
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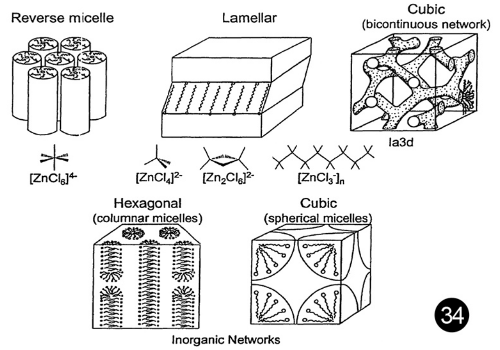
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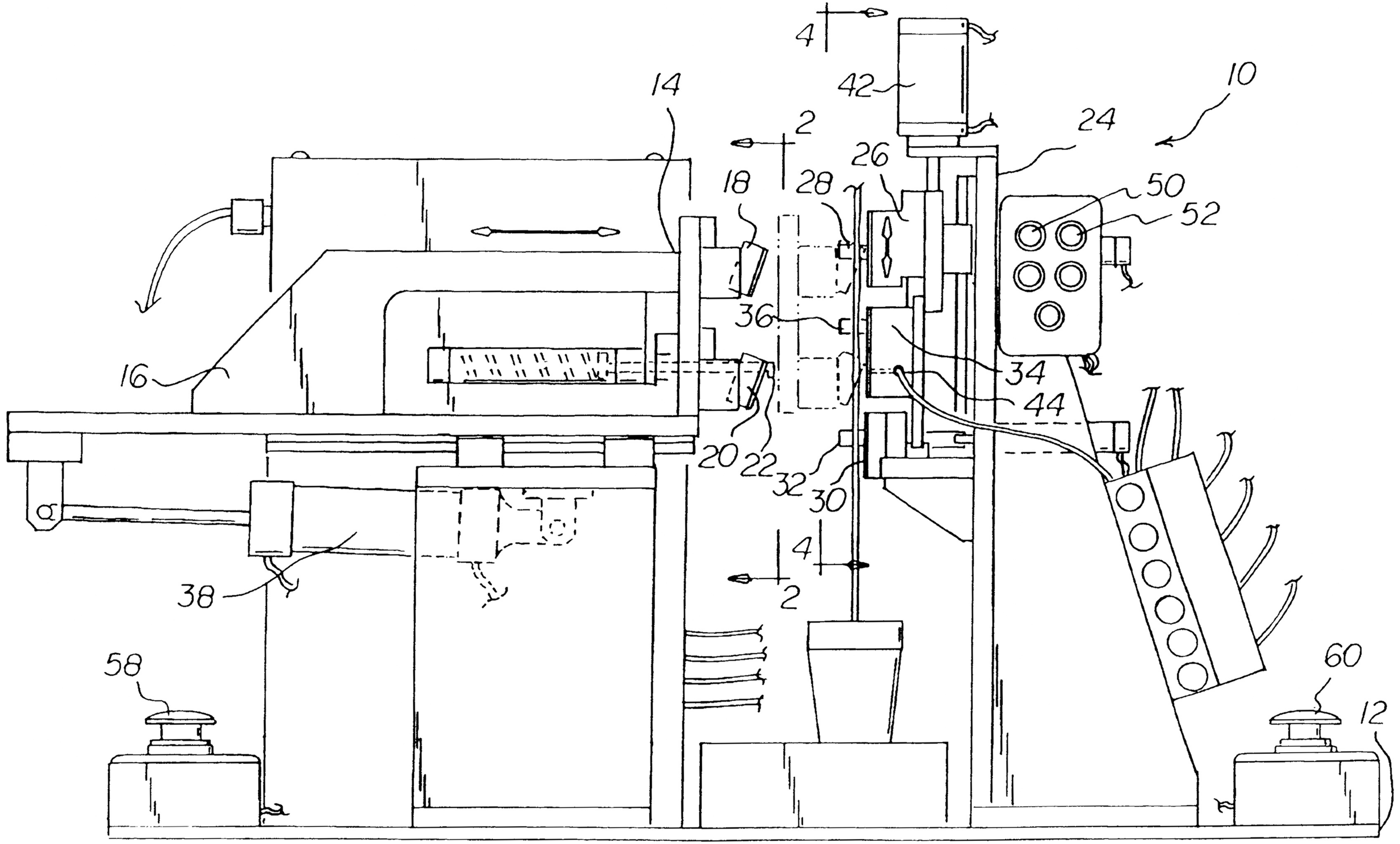
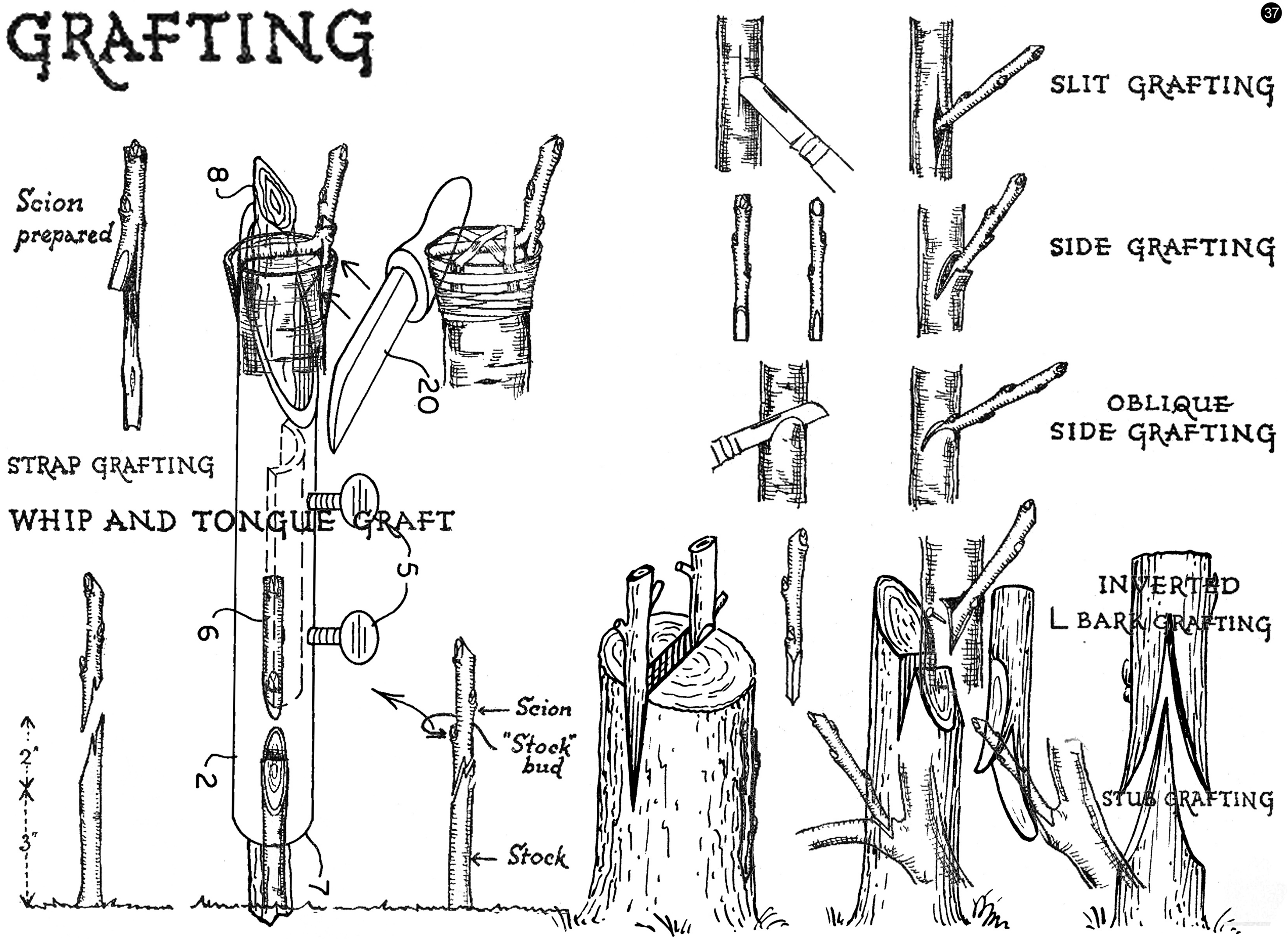
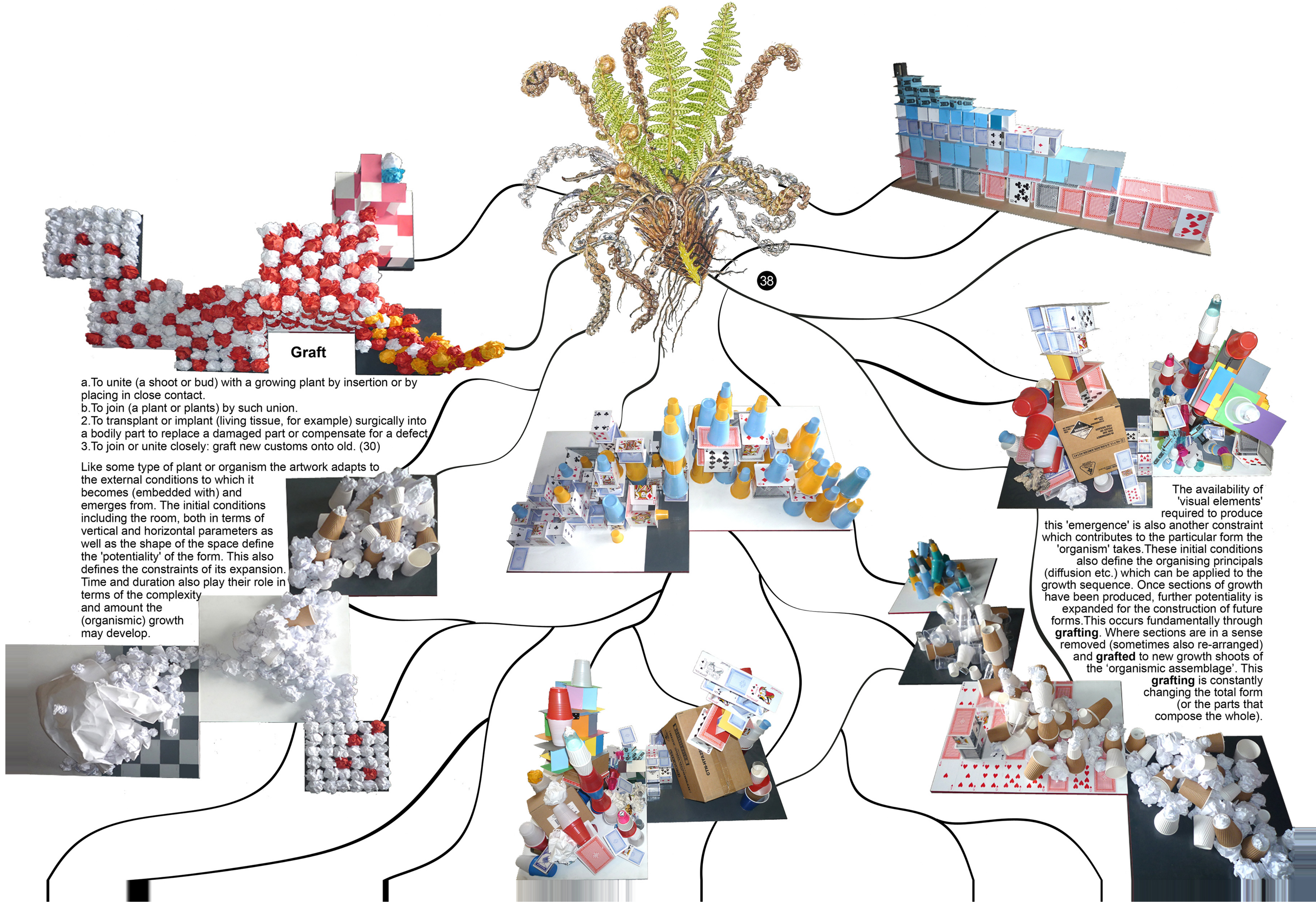
Machinic Plant grafting system



GRAFTING





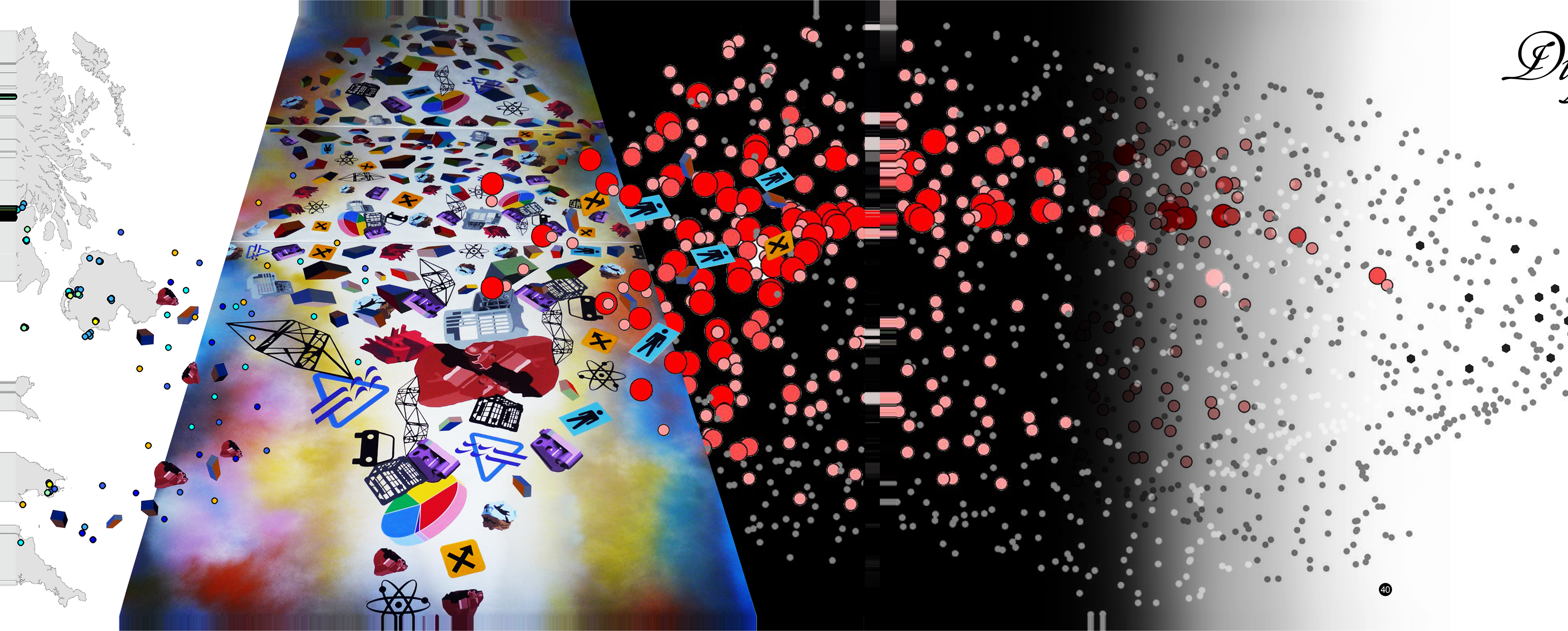
Graft

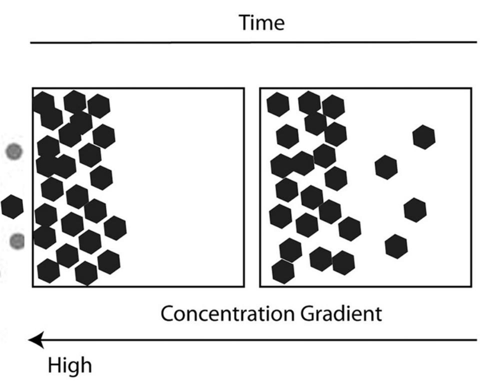
a.To unite (a shoot or bud) with a growing plant by insertion or by placing in close contact.
b.To join (a plant or plants) by such union.
2.To transplant or implant (living tissue, for example) surgically into a bodily part to replace a damaged part or compensate for a defect
3.To join or unite closely: graft new customs onto old. (30)

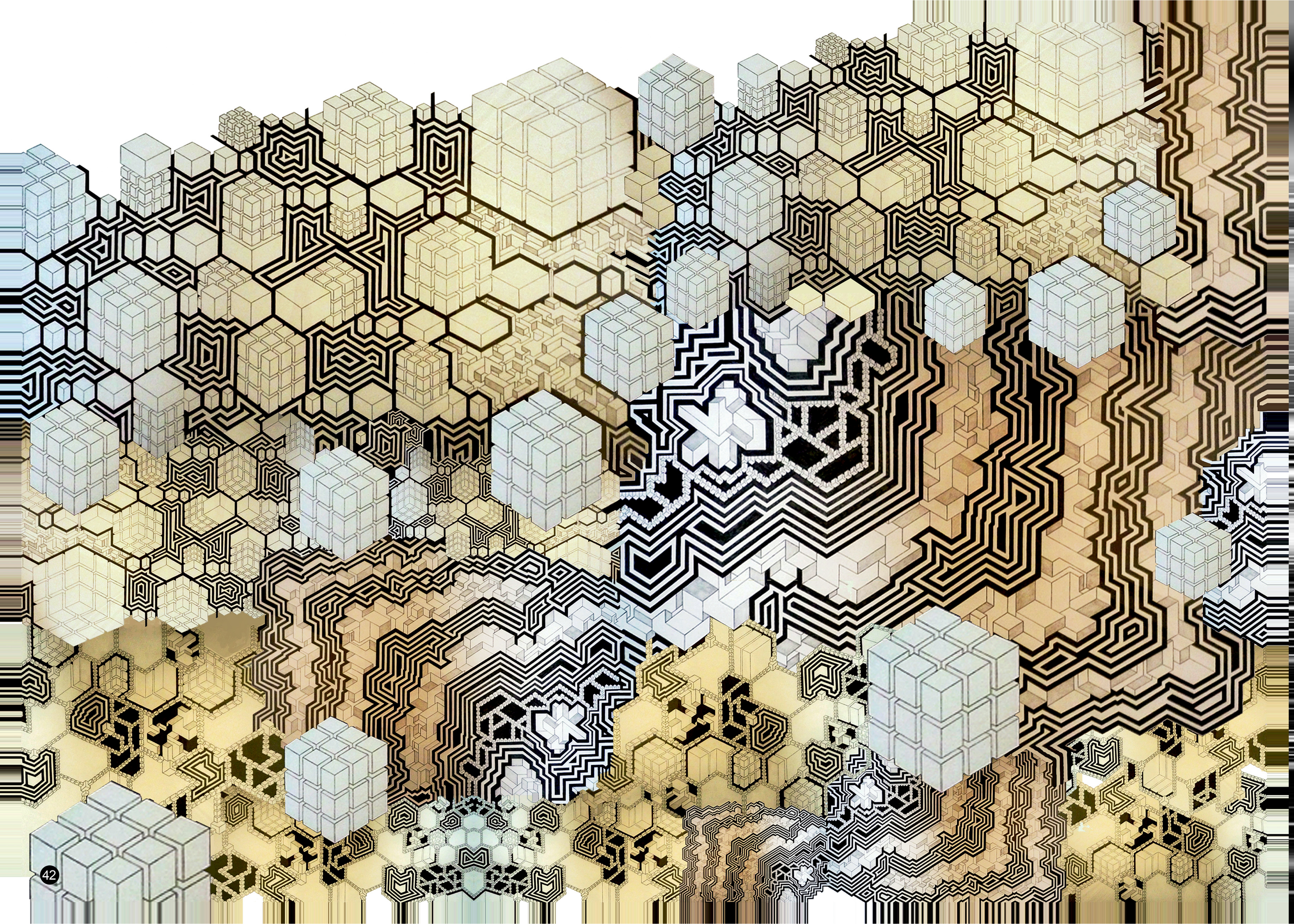
Like some type of plant or organism the artwork adapts to the external conditions to which it becomes (embedded with) and emerges from. The initial conditions including the room, both in terms of vertical and horizontal parameters as well as the shape of the space define the 'potentiality' of the form. This also defines the constraints of its expansion. Time and duration also play their role in terms of the complexity and amount the (organismic) growth may develop.

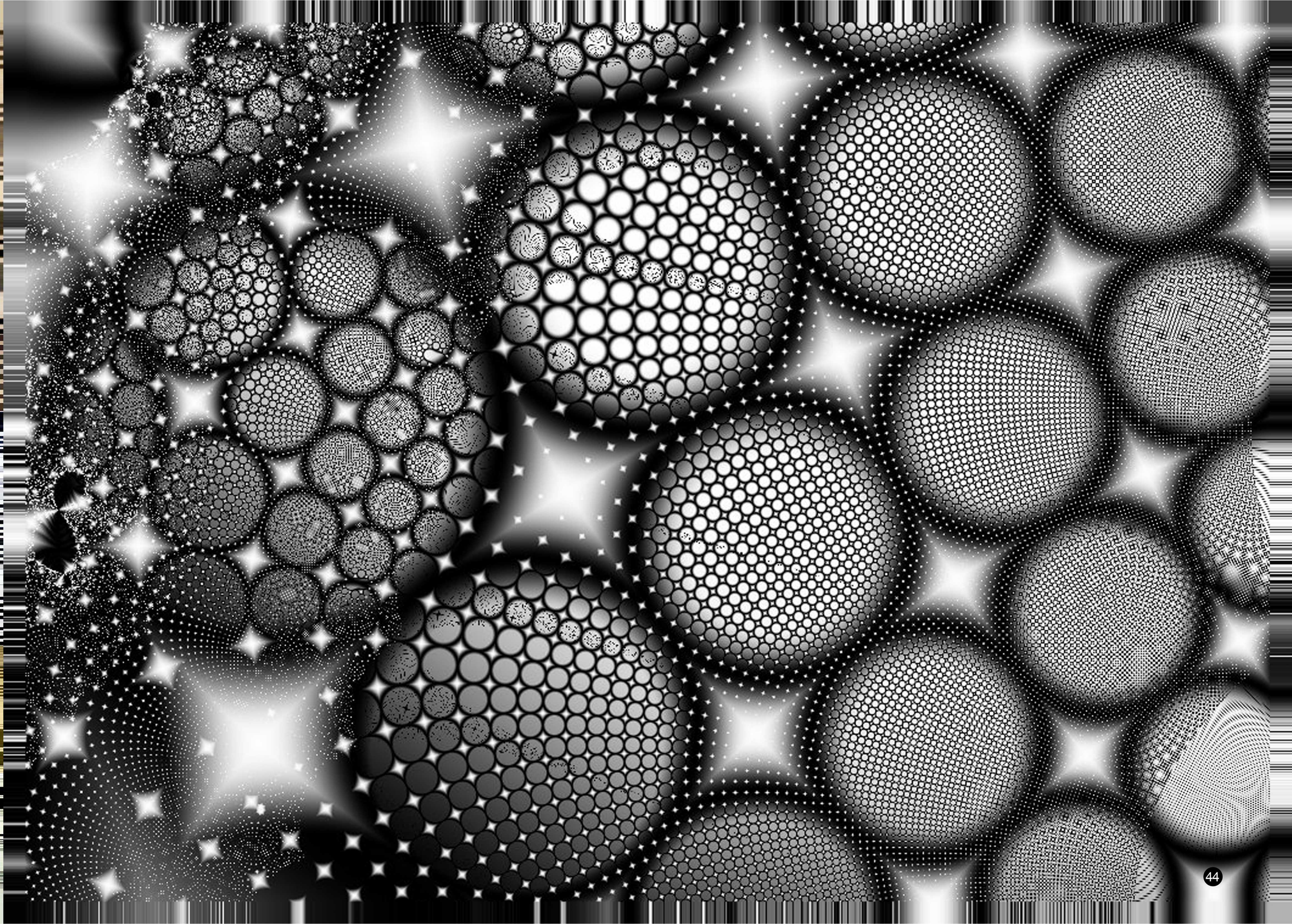
The availability of 'visual elements' required to produce this 'emergence' is also another constraint which contributes to the particular form the 'organism' takes.These initial conditions also define the organising principals (diffusion etc.) which can be applied to the growth sequence. Once sections of growth have been produced, further potentiality is expanded for the construction of future forms.This occurs fundamentally through **grafting**. Where sections are in a sense removed (sometimes also re-arranged) and **grafted** to new growth shoots of the ‘organismic assemblage’. This **grafting** is constantly changing the total form (or the parts that compose the whole).

Diffusion

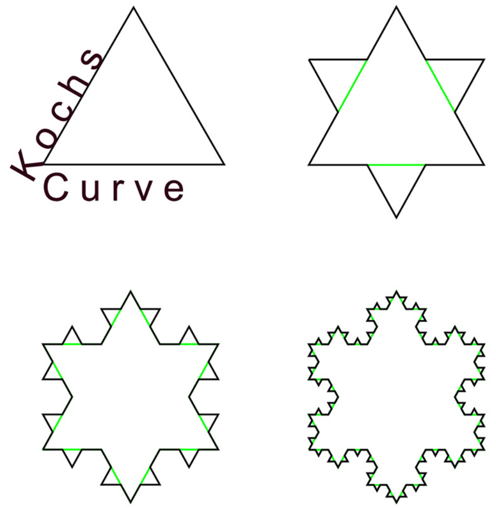


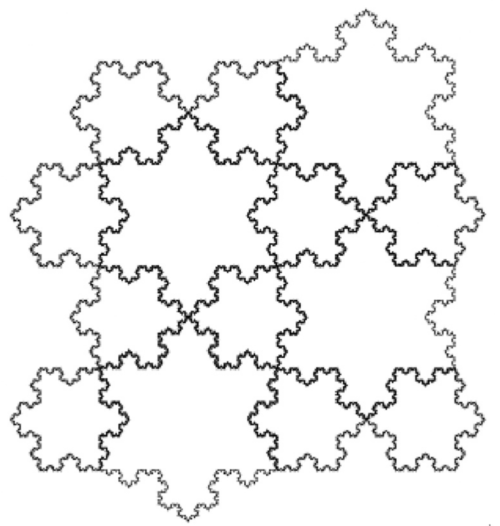


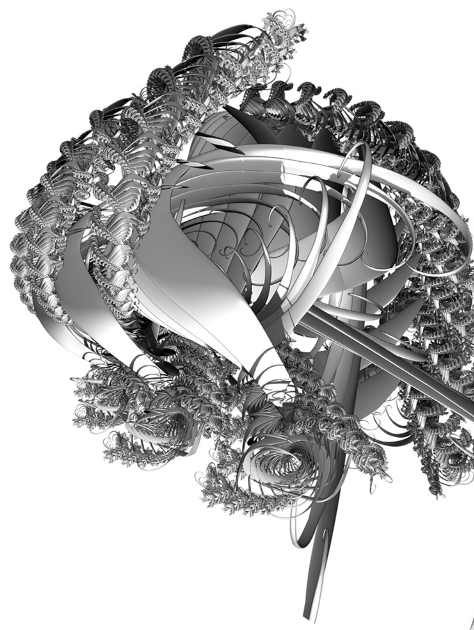




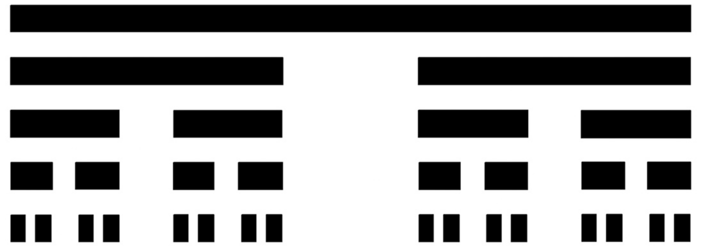
Fractal-ology







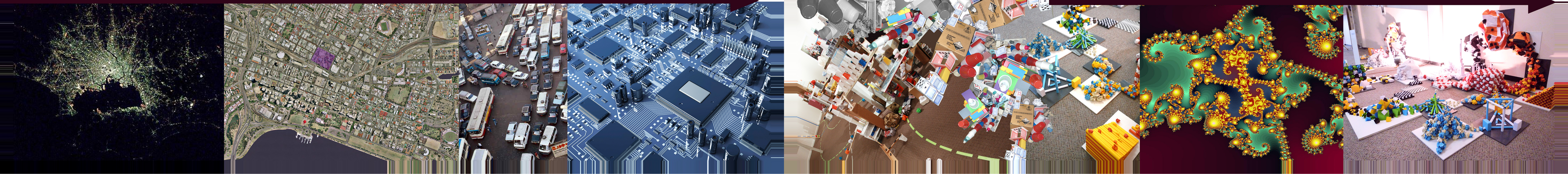
The Cantor Set



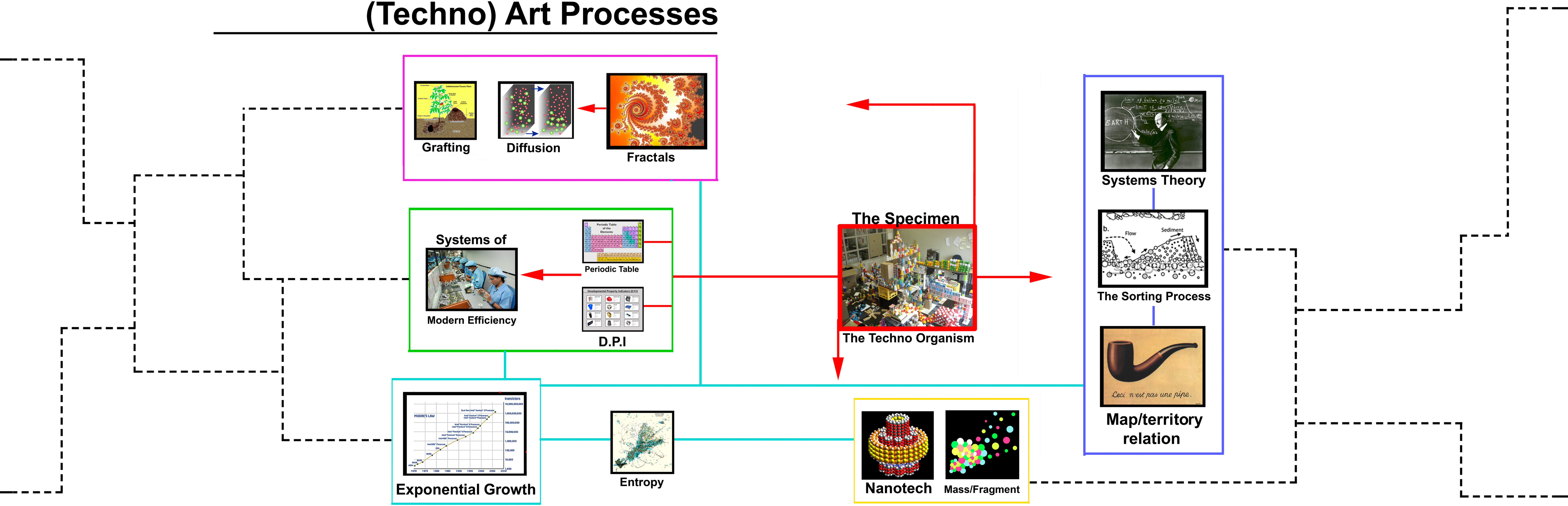
Fractals. In physics, mathematics and in nature there are shapes and structures which although they appear to be irregular and random, nevertheless have a special pattern of regularity in their ‘randomness’. This regularity, called ‘self-similarity’, derives from the fact that at whatever magnification these systems are veiwed they still look much the same. (32)

The variation of scales and the complexity that occurs from the build up of self-similar forms and shapes is integral to the geometrical concept of fractals. This is also a crucial organising principal within a variety of perspectives in the artwork. The work emulates these systems as well as utilising the internal logic of the creation of nodes that occurs with fractal geometry. The artwork is a series of interconnected nodes existing on a variety of scales constructed through repeating visual elements.

Self **Similarity**---------------- **Replicate**------------through **SCALES**



(Techno) Art Processes



Grafting

Diffusion

Fractals

Systems of Modern Efficiency

Periodic Table

D.P.I

The Specimen

The Techno Organism

Systems Theory

The Sorting Process

Map/territory relation

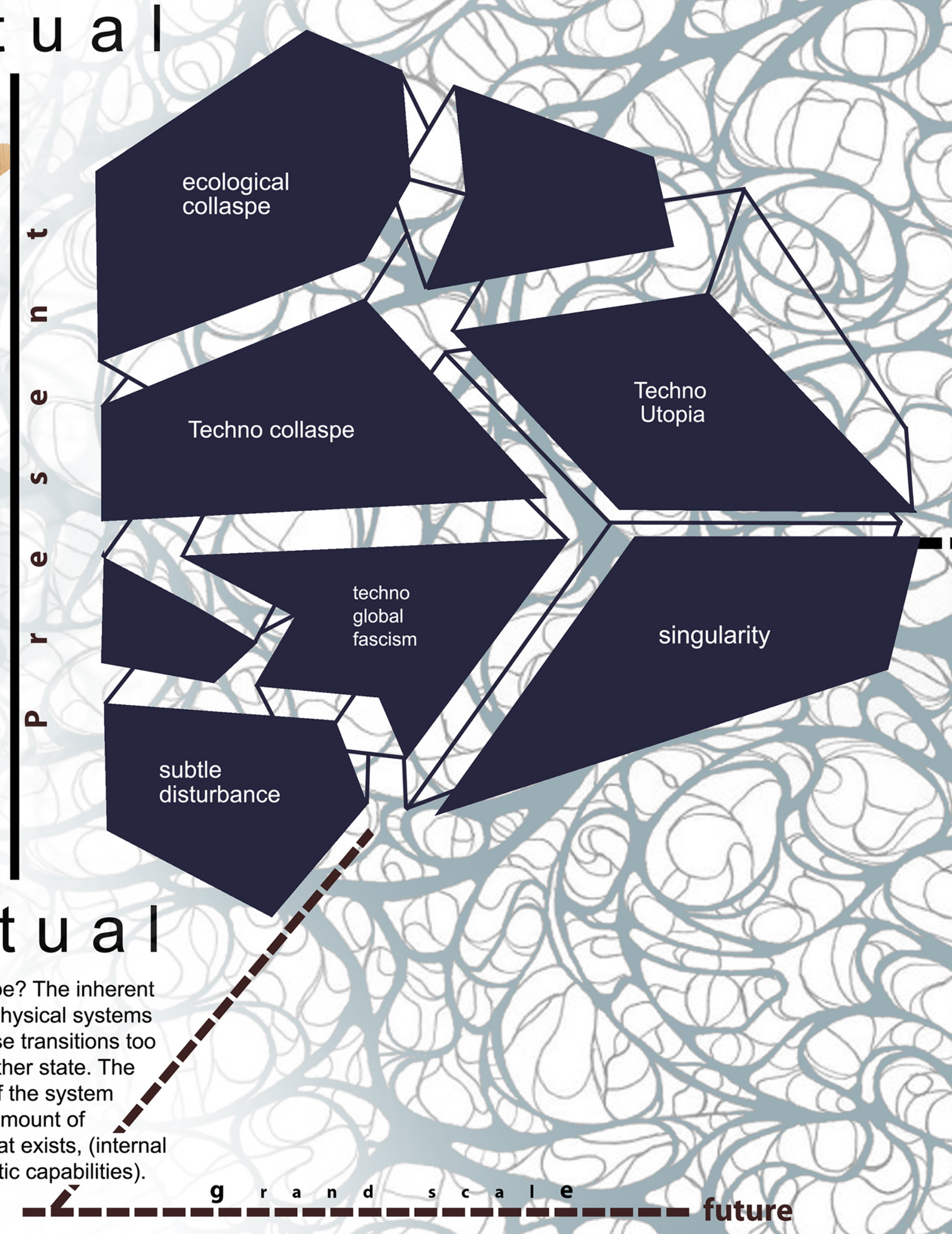
Exponential Growth

Entropy

Nanotech

Mass/Fragment

The present state a physical system exists in. The actual relates to the familiar domain of fully formed entities; these entities may exist on numerous scales (i.e: a vessel of water to a functioning city).



What could be? The inherent potential of physical systems through phase transitions too become another state. The complexity of the system defines the amount of (potential) that exists, (internal morphogenetic capabilities).

Cyber-netics / GST

Cybernetics
A subject which dates from 1942 and was named in 1947 by Norbert Wiener and Arturo Rosenbleuth, distinguished mathematician and physician respectively. It was then defined as 'the science of control and communication in the animal and machine'.

This definition indicated [1] that a state of 'in control' depends on the flow of information, and [2] that the laws governing control are universal, i.e. do not depend on the classical dichotomy between organic and inorganic systems. The name cybernetics derives from the Greek word 'steersman', and was chosen to show that adaptive control is more like steersmanship than dictatorship. Today, a more general definition of cybernetics might be preferred: the science of effective organisation.

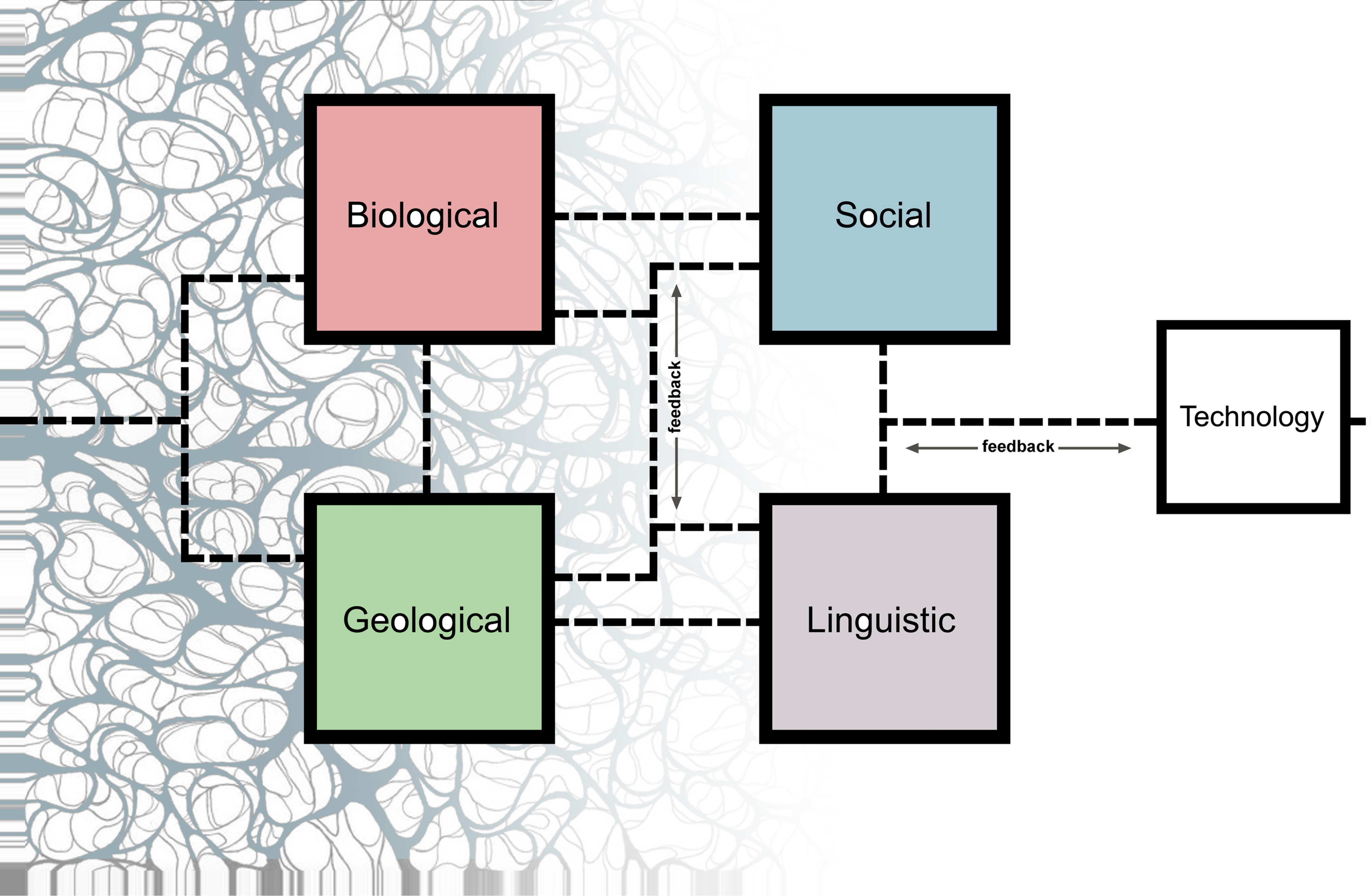
Always an interdisciplinary subject, cybernetics was seen by its founding fathers moreover as transdisciplinary... (33)

GST
A movement in scientific theory which originated from developments in the 1940's and 1950's. It has influenced almost every scientific discipline, including the social sciences, and was a reaction against the atomistic and fragmented acquisition of knowledge resulting from excessive specialisation. One major source of impetus towards a more holistic approach arose in the biological sciences.

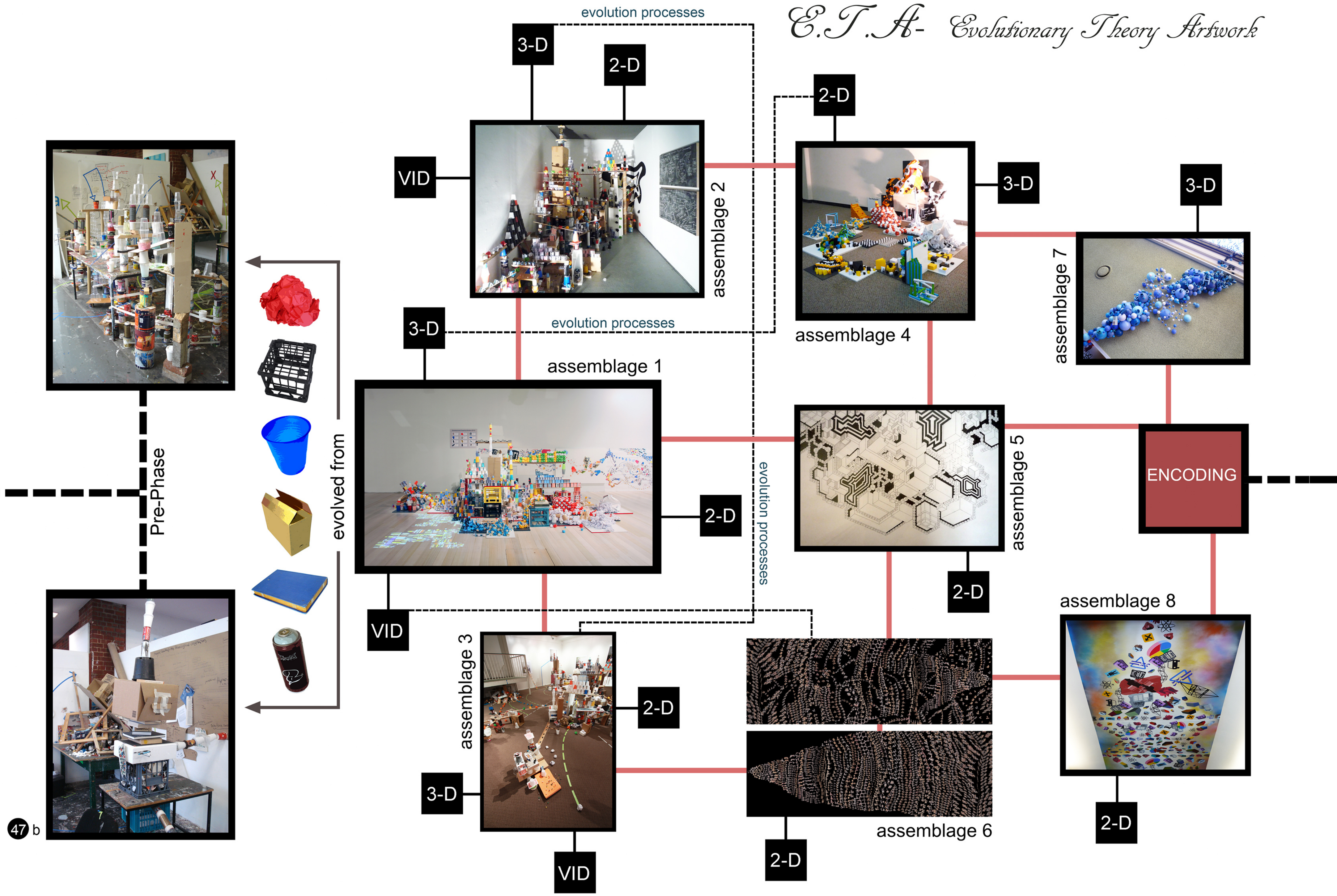
In studying living organisms interactions with their environment it was found rewarding to study the whole ecological system as a single unit, and the processes by which living organisms maintain homoeostasis or metabolic equilibrium while adapting to changes in their environment.... It sought to discover general patterns, trends and structural characteristics in all types of system- natural, social and technological- and on this basis to develop a unifying General Systems Theory of universal applicability... (34)

We live in a world populated by structures- a complex mixture of geological , biological, social, and linguistic constructions that are nothing but accumulations of materials shaped and hardened by history. Immersed as we are in this mixture, we cannot help but interact in a variety of ways with the other historical constructions that surround us, and in these interactions we generate novel combinations, some of which possess emergent properties. In turn, these synergistic combinations, whether of human origin or not, become the raw material for further mixtures. This is how the population of structures inhabiting our planet has acquired its rich variety, as the entry of novel materials into the mix triggers wild proliferations of new forms. (35)

Cyber-netics / GST


Biological
Social
Geological
Linguistic
Technology
feedback
feedback

E.T.A- Evolutionary Theory Artwork



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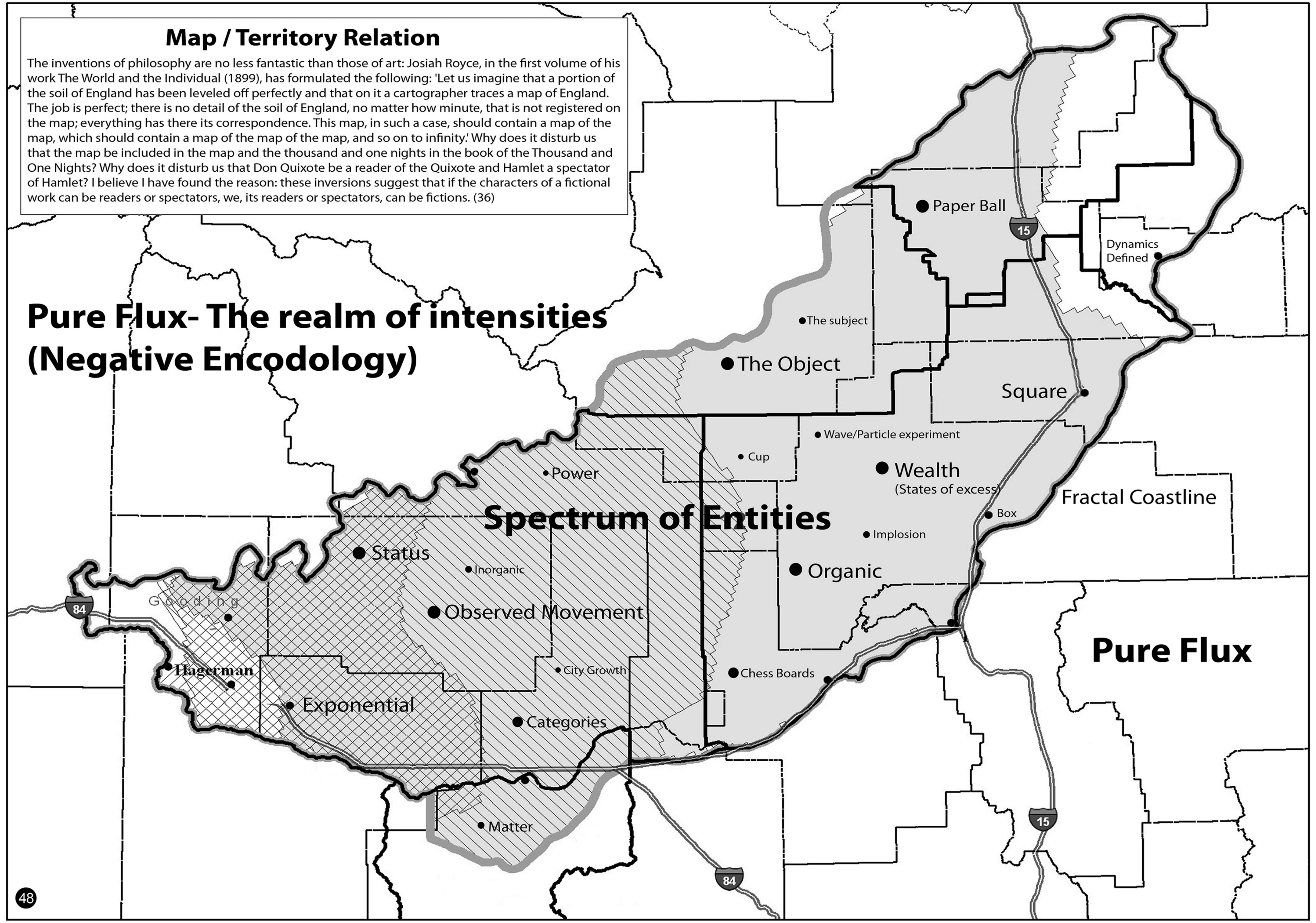

Map / Territory Relation

The inventions of philosophy are no less fantastic than those of art: Josiah Royce, in the first volume of his work The World and the Individual (1899), has formulated the following: 'Let us imagine that a portion of the soil of England has been leveled off perfectly and that on it a cartographer traces a map of England. The job is perfect; there is no detail of the soil of England, no matter how minute, that is not registered on the map; everything has there its correspondence. This map, in such a case, should contain a map of the map, which should contain a map of the map of the map, and so on to infinity.' Why does it disturb us that the map be included in the map and the thousand and one nights in the book of the Thousand and One Nights? Why does it disturb us that Don Quixote be a reader of the Quixote and Hamlet a spectator of Hamlet? I believe I have found the reason: these inversions suggest that if the characters of a fictional work can be readers or spectators, we, its readers or spectators, can be fictions. (36)

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Mass

Noun
1. A large amount of substance that does not have a definite form.
2. A large amount or quantity of something.
3. A large number of people or things grouped together, often in a confused way.

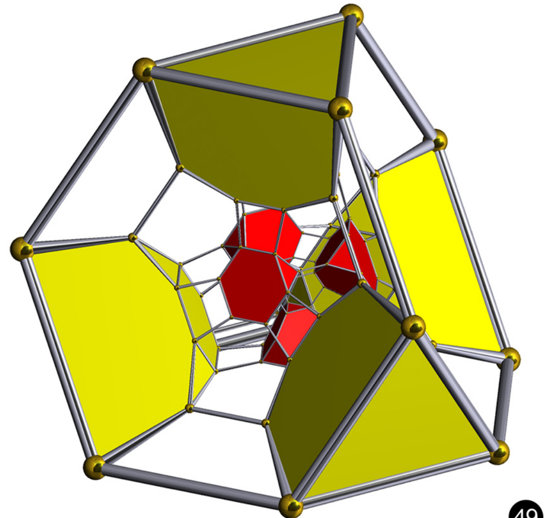
Adjective
Affecting or involving a large number of people or things.

Verb
To come together in large numbers; to gather people or things together in large numbers. (37)

Noun
A small part that has broken off or comes from something larger.

Verb
To break or make something break into small pieces or parts. (38)

Fragment



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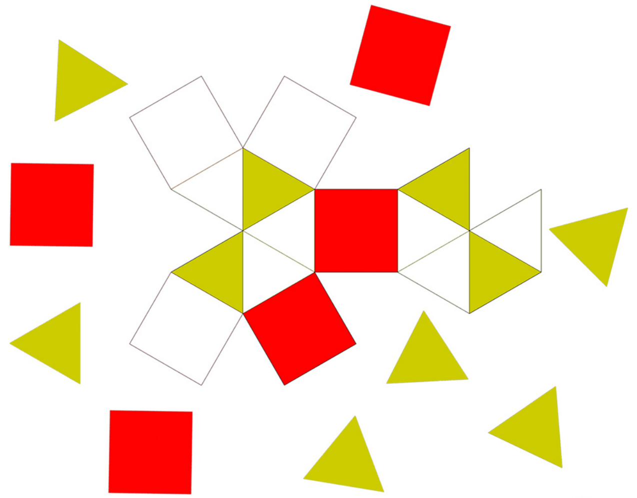

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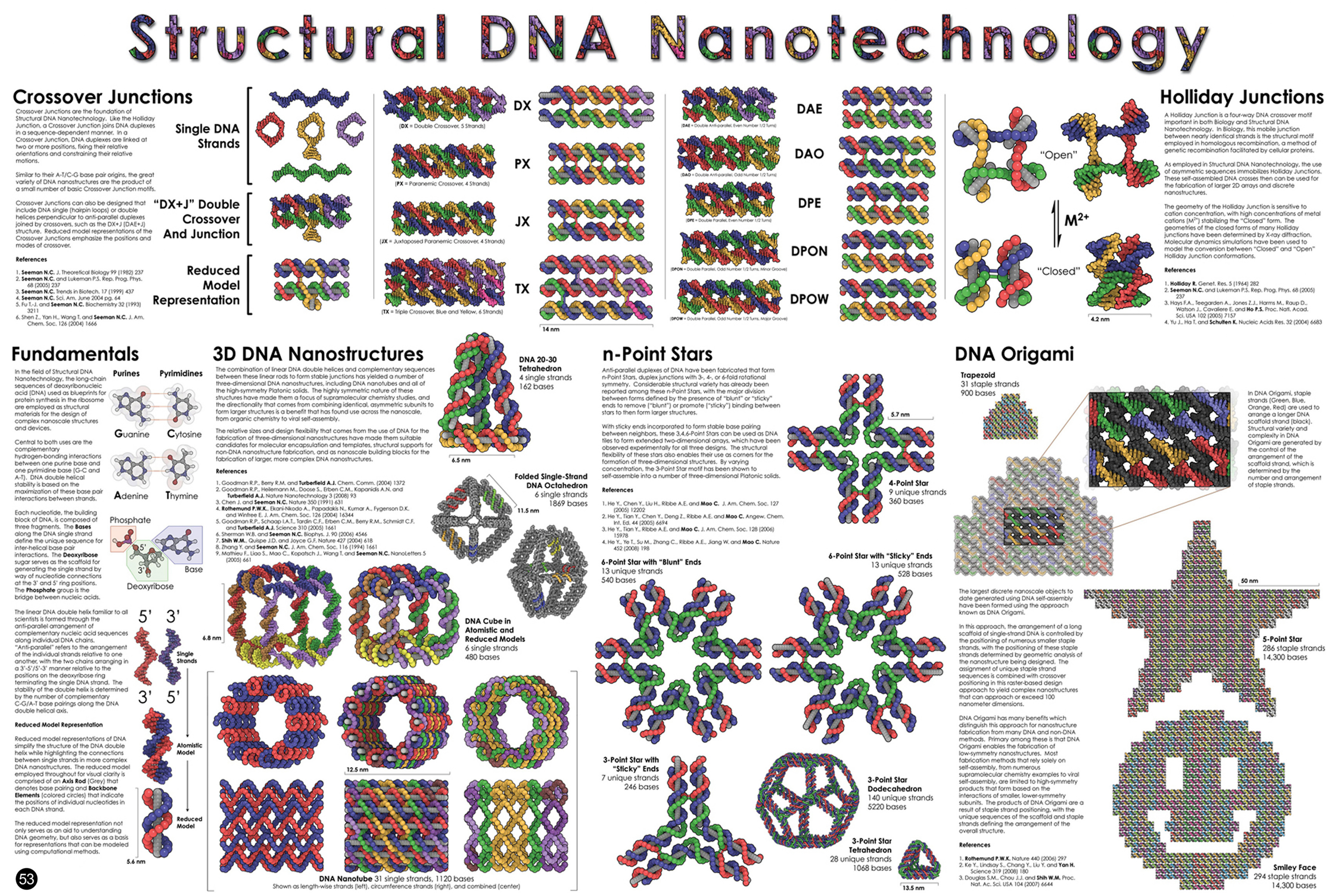

Structural DNA Nanotechnology

Crossover Junctions

Crossover Junctions are the foundation of Structural DNA Nanotechnology. Like the Holliday Junction, a Crossover Junction joins DNA duplexes in a sequence-dependent manner. In a Crossover Junction, DNA duplexes are linked at two or more positions, fixing their relative orientations and constraining their relative motions.

Similar to their A-T/C-G base pair origins, the great variety of DNA nanostructures are the product of a small number of basic Crossover Junction motifs.

Crossover Junctions can also be designed that include DNA single (hairpin loops) or double helices perpendicular to anti-parallel duplexes joined by crossovers, such as the DX+J (DAE+J) structure. Reduced model representations of the Crossover Junctions emphasize the positions and modes of crossover.

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Holliday Junctions

A Holliday Junction is a four-way DNA crossover motif important in both Biology and Structural DNA Nanotechnology. In Biology, this mobile junction between nearly identical strands is the structural motif employed in homologous recombination, a method of genetic recombination facilitated by cellular proteins.

As employed in Structural DNA Nanotechnology, the use of asymmetric sequences immobilizes Holliday Junctions. These self-assembled DNA crosses then can be used for the fabrication of larger 2D arrays and discrete nanostructures.

The geometry of the Holliday Junction is sensitive to cation concentration, with high concentrations of metal cations (M^{2+}) stabilizing the "Closed" form. The geometries of the closed forms of many Holliday junctions have been determined by X-ray diffraction. Molecular dynamics simulations have been used to model the conversion between "Closed" and "Open" Holliday Junction conformations.

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Fundamentals

In the field of Structural DNA Nanotechnology, the long-chain sequences of deoxyribonucleic acid (DNA) used as blueprints for protein synthesis in the ribosome are employed as structural materials for the design of complex nanoscale structures and devices.

Central to both uses are the complementary hydrogen-bonding interactions between one purine base and one pyrimidine base (G-C and A-T). DNA double helical stability is based on the maximization of these base pair interactions between strands.

Each nucleotide, the building block of DNA, is composed of three fragments. The **Bases** along the DNA single strand define the unique sequence for inter-helical base pair interactions. The **Deoxyribose** sugar serves as the scaffold for generating the single strand by way of nucleotide connections at the 3' and 5' ring positions. The **Phosphate** group is the bridge between nucleic acids.

The linear DNA double helix familiar to all scientists is formed through the anti-parallel arrangement of complementary nucleic acid sequences along individual DNA chains. "Anti-parallel" refers to the arrangement of the individual strands relative to one another, with the two chains arranging in a 3'-5'/5'-3' manner relative to the positions on the deoxyribose ring terminating the single DNA strand. The stability of the double helix is determined by the number of complementary C-G/A-T base pairings along the DNA double helical axis.

Reduced Model Representation

Reduced model representations of DNA simplify the structure of the DNA double helix while highlighting the connections between single strands in more complex DNA nanostructures. The reduced model employed throughout for visual clarity is comprised of an **Axis Rod** (Grey) that denotes base pairing and **Backbone Elements** (colored circles) that indicate the positions of individual nucleotides in each DNA strand.

The reduced model representation not only serves as an aid to understanding DNA geometry, but also serves as a basis for representations that can be modeled using computational methods.

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3D DNA Nanostructures

The combination of linear DNA double helices and complementary sequences between these linear rods to form stable junctions has yielded a number of three-dimensional DNA nanostructures, including DNA nanotubes and all of the high-symmetry Platonic solids. The highly symmetric nature of these structures have made them a focus of supramolecular chemistry studies, and the directionality that comes from combining identical, asymmetric subunits to form larger structures is a benefit that has found use across the nanoscale, from organic chemistry to viral self-assembly.

The relative sizes and design flexibility that comes from the use of DNA for the fabrication of three-dimensional nanostructures have made them suitable candidates for molecular encapsulation and templates, structural supports for non-DNA nanostructure fabrication, and as nanoscale building blocks for the fabrication of larger, more complex DNA nanostructures.

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DNA Nanotube 31 single strands, 1120 bases
Shown as length-wise strands (left), circumference strands (right), and combined (center)

n-Point Stars

Anti-parallel duplexes of DNA have been fabricated that form n-Point Stars, duplex junctions with 3-, 4-, or 6-fold rotational symmetry. Considerable structural variety has already been reported among these n-Point Stars, with the major division between forms defined by the presence of "blunt" or "sticky" ends to remove ("blunt") or promote ("sticky") binding between stars to then form larger structures.

With sticky ends incorporated to form stable base pairing between neighbors, these 3,4,6-Point Stars can be used as DNA tiles to form extended two-dimensional arrays, which have been observed experimentally for all three designs. The structural flexibility of these stars also enables their use as corners for the formation of three-dimensional structures. By varying concentration, the 3-Point Star motif has been shown to self-assemble into a number of three-dimensional Platonic solids.

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DNA Origami

In DNA Origami, staple strands (Green, Blue, Orange, Red) are used to arrange a longer DNA scaffold strand (black). Structural variety and complexity in DNA Origami are generated by the control of the arrangement of the scaffold strand, which is determined by the number and arrangement of staple strands.

The largest discrete nanoscale objects to date generated using DNA self-assembly have been formed using the approach known as DNA Origami.

In this approach, the arrangement of a long scaffold of single-strand DNA is controlled by the positioning of numerous smaller staple strands, with the positioning of these staple strands determined by geometric analysis of the nanostructure being designed. The assignment of unique staple strand sequences is combined with crossover positioning in this raster-based design approach to yield complex nanostructures that can approach or exceed 100 nanometer dimensions.

DNA Origami has many benefits which distinguish this approach for nanostructure fabrication from many DNA and non-DNA methods. Primary among these is that DNA Origami enables the fabrication of low-symmetry nanostructures. Most fabrication methods that rely solely on self-assembly, from numerous supramolecular chemistry examples to viral self-assembly, are limited to high-symmetry products that form based on the interactions of smaller, lower-symmetry subunits. The products of DNA Origami are a result of staple strand positioning, with the unique sequences of the scaffold and staple strands defining the arrangement of the overall structure.

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A basic definition: Nanotechnology is the engineering of functional systems at the molecular scale. This covers both current work and concepts that are more advanced.A basic definition: Nanotechnology is the engineering of functional systems at the molecular scale. This covers both current work and concepts that are more advanced. In its original sense, 'nanotechnology' refers to the projected ability to construct items from the bottom up, using techniques and tools being developed today to make complete, high performance products. (39)

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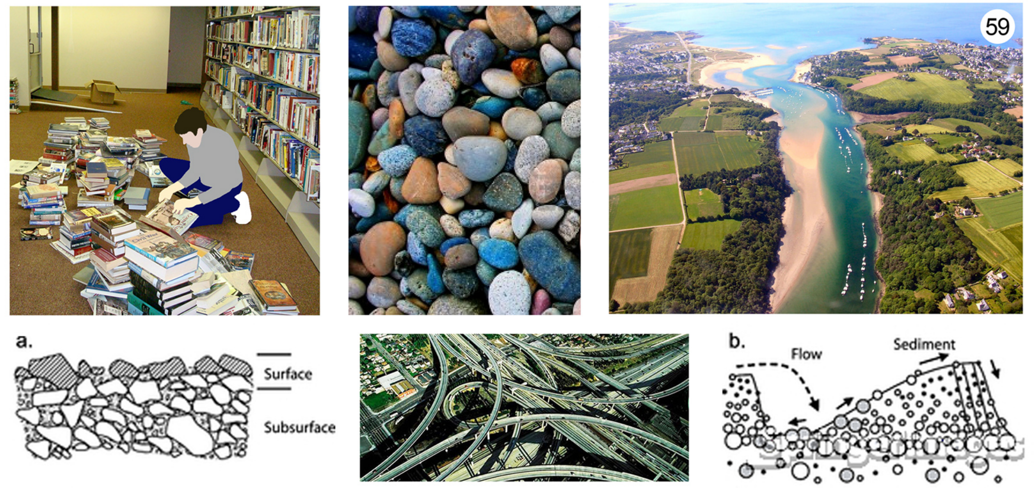
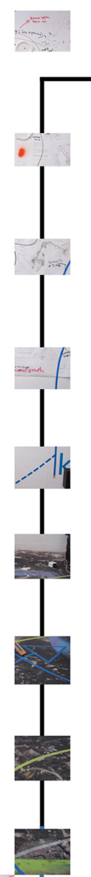
The Sorting Process

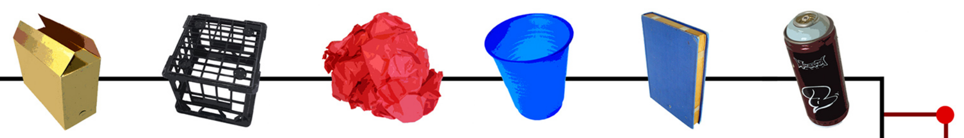
The various systems, parts, assemblages and fragments that compose the work should be best interpreted as a multi-layered sorting process; always rotating, rearranging, skewing their tilt and creating new divisions and order for the visual elements that make up the work. In using this analogy, in many ways technology can be best understood as being implicated in a grand historical sorting process. Materials, environment, organisms, ideas etc. all entangle in an array of contingent structures feeding off one another. Some reach extinction; others survive to mark their presence in the now.

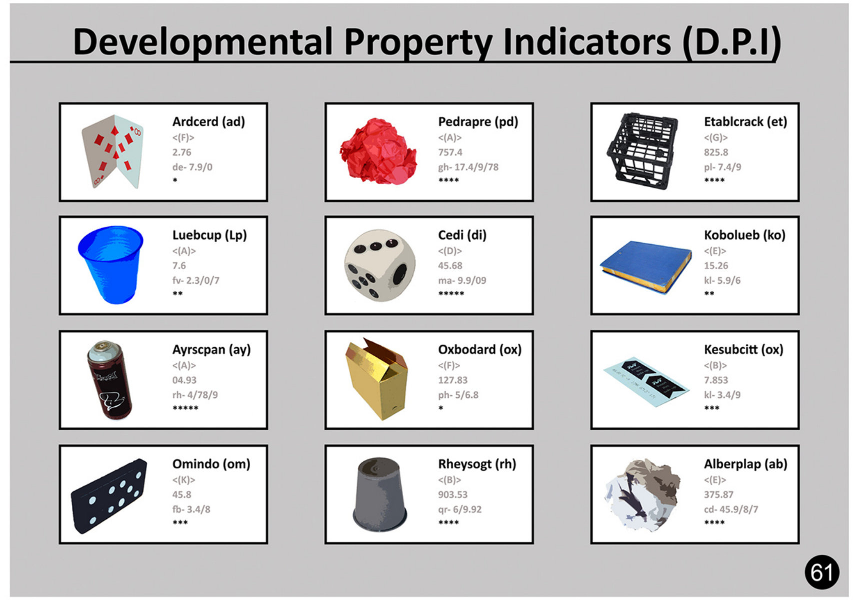




The construction of the first 'table of elements' made possible the entire visual language the project has developed. This emerged from studio-based structures that grew in parallel to another artwork completed before this research project was started. These works began as structural doodles as an outlet for frustrated energy whilst a long and tedious body of paintings was being produced. Forming out the mundane everyday materials that frequented my space: coffee cups, paper, spray cans, plastic cups etc. These things were part of the first sorting process in this project, arranging themselves by mimicking the organising principals found in the painting.

Some of the objects were eventually dismissed and others retained as they were rated according the categories found in the section 'Systems of Modern Efficiency'. The preserved objects hardened or solidified into the first table of elements utilised for this research project; the first phase transition into the code. The simple shuffling of the name of the object into a new anagrammatic form works to delineate this transfer. For example, spray can becomes Ayrscpan (ay).

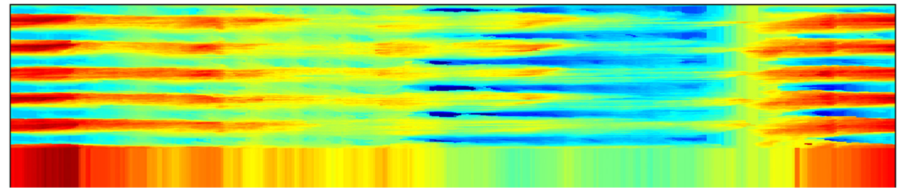


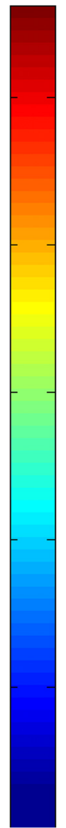


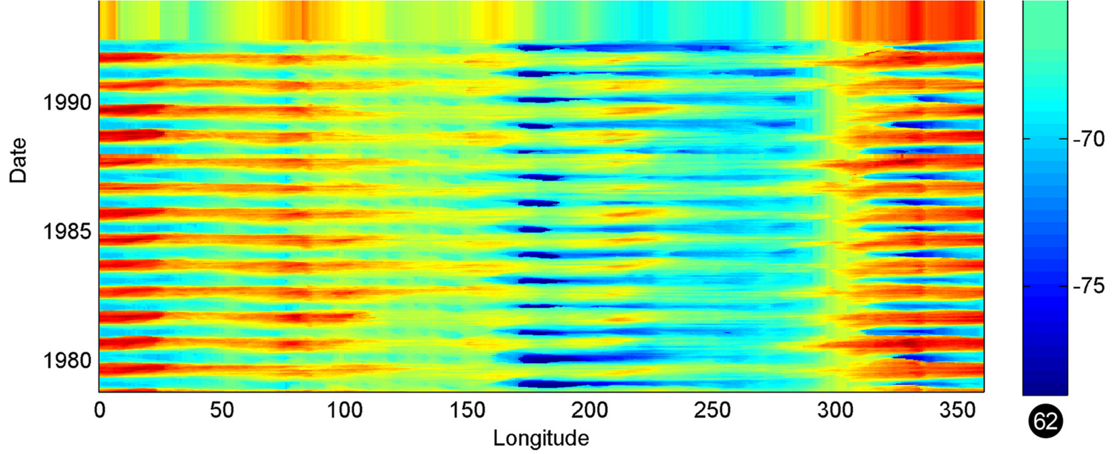
Developmental Property Indicators (D.P.I)

Ardcerd (ad) <(F)> 2.76 de- 7.9/0 *	**Pedrapre (pd)** <(A)> 757.4 gh- 17.4/9/78 ****	**Etablcrack (et)** <(G)> 825.8 pl- 7.4/9 ****
Luebcup (Lp) <(A)> 7.6 fv- 2.3/0/7 **	**Cedi (di)** <(D)> 45.68 ma- 9.9/09 *****	**Kobolueb (ko)** <(E)> 15.26 kl- 5.9/6 **
Ayrscpan (ay) <(A)> 04.93 rh- 4/78/9 *****	**Oxbodard (ox)** <(F)> 127.83 ph- 5/6.8 *	**Kesubcitt (ox)** <(B)> 7.853 kl- 3.4/9 ***
Omindo (om) <(K)> 45.8 fb- 3.4/8 ***	**Rheysogt (rh)** <(B)> 903.53 qr- 6/9.92 ****	**Alberplap (ab)** <(E)> 375.87 cd- 45.9/8/7 ****

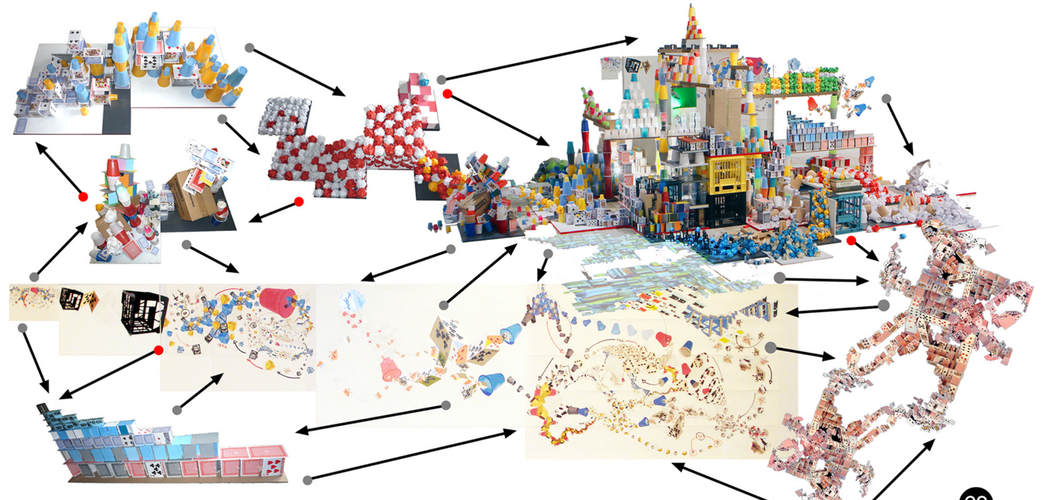
Understood in this sense of encoding, the project can also be seen as operating as a form of archive. Utilising the particular definition of archive as: any extensive record or collection of data, the visual vocabulary can be seen as existing in this logic. The artwork is created through data, taking everyday objects and encoding them into a system of elements or visual motifs. Once the first 'table of elements' had emerged the objects could then expand spatially through the use of the visual algorithm; or the generating of different modes of organisation. The specifics of these 'modes of organisation' are outlined more thoroughly in this chapter: for example grafting, nanotechnology and diffusion.





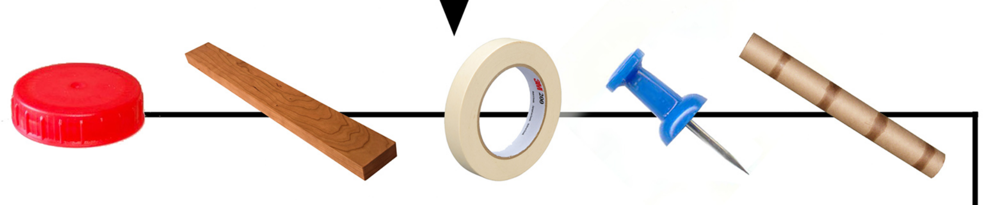


Once the first strings of growth had surfaced, the natural inclination for 'Assemblage 1 (7/09 a.c)' was to maximise its connection points. This was achieved by maintaining a diverse range of organising principals and visual elements utilised for this, as new connections could only occur when subtle variations were applied. This enabled difference to be generated while maintaining an order and consistency to the accumulation of specific assemblages. At a stage in this assemblage the connections migrated to other modes of artistic organisation ⌧ painting, photography, drawing (2-D) and also video (vid). This allowed further diversity of movements to occur in 'the sorting process'.



Assemblage 1 (7/09 a.c)

Once the first 'Assemblage 1 (7/09 a.c)' had been expanded in both time and space, a new 'sorting process' appeared, shifting the previous visual elements that compose the work. From this a new 'table of elements' came into existence. Once again some 'elements' were retained while others were replaced with new objects. These objects manifested as new connections were imposed on the workings of the grander project. These included factors such as spatial (new conditions for growth) and time restraints, distance to travel (for site specific assemblage constructions) and the inherent mechanisms creating variations of diversity.



The new 'visual elements' that were absorbed into a revitalised 'table of elements' (like the initial elements) grew out of a close proximity to the existing assemblage growth (my studio/art school). New things like tape rolls, drawing pins, paper rolls and wooden planks to name a few, established themselves in the new 'table' as they sufficiently complied with the principals of element selection. While other pre-existing 'elements' such as the cardboard box adapted its scale to allow for new growth potential. This new mutation (and addition) to the project's 'table of elements' charts was the foundation for 'Assemblage 2 (9/09 a.c)'.

Assemblage 2 (9/09 a.c)

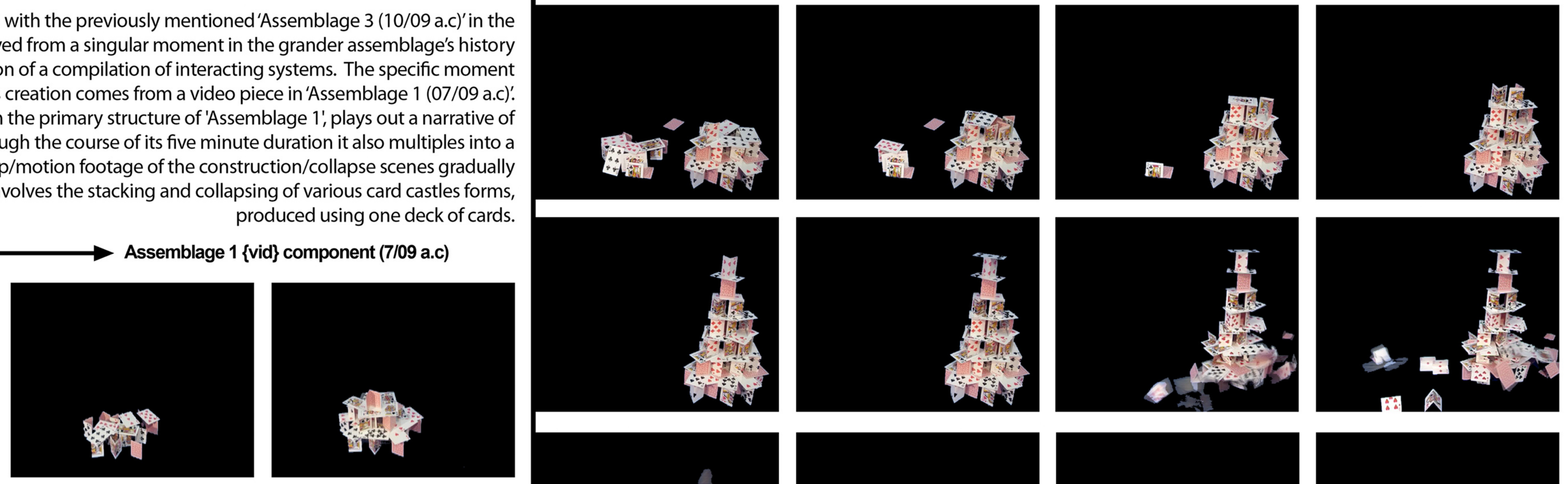
Other assemblages emerged in different ways. An example of this is 'Assemblage 3 (10/09 a.c)', which generated its form from exploring the sculptural and structural potential of a piece of A4 paper. This 'assemblage' should be understood as a form of simultaneous de-evolution/evolution: de-evolution in the sense that the pristine A4 paper that comprises the foundation for the assemblage comes from reversing a screwed up paper ball (an original 'element' from Assemblage 1). The object returns to its initial state of purity ⌧ a flat unadulterated geometric shape.

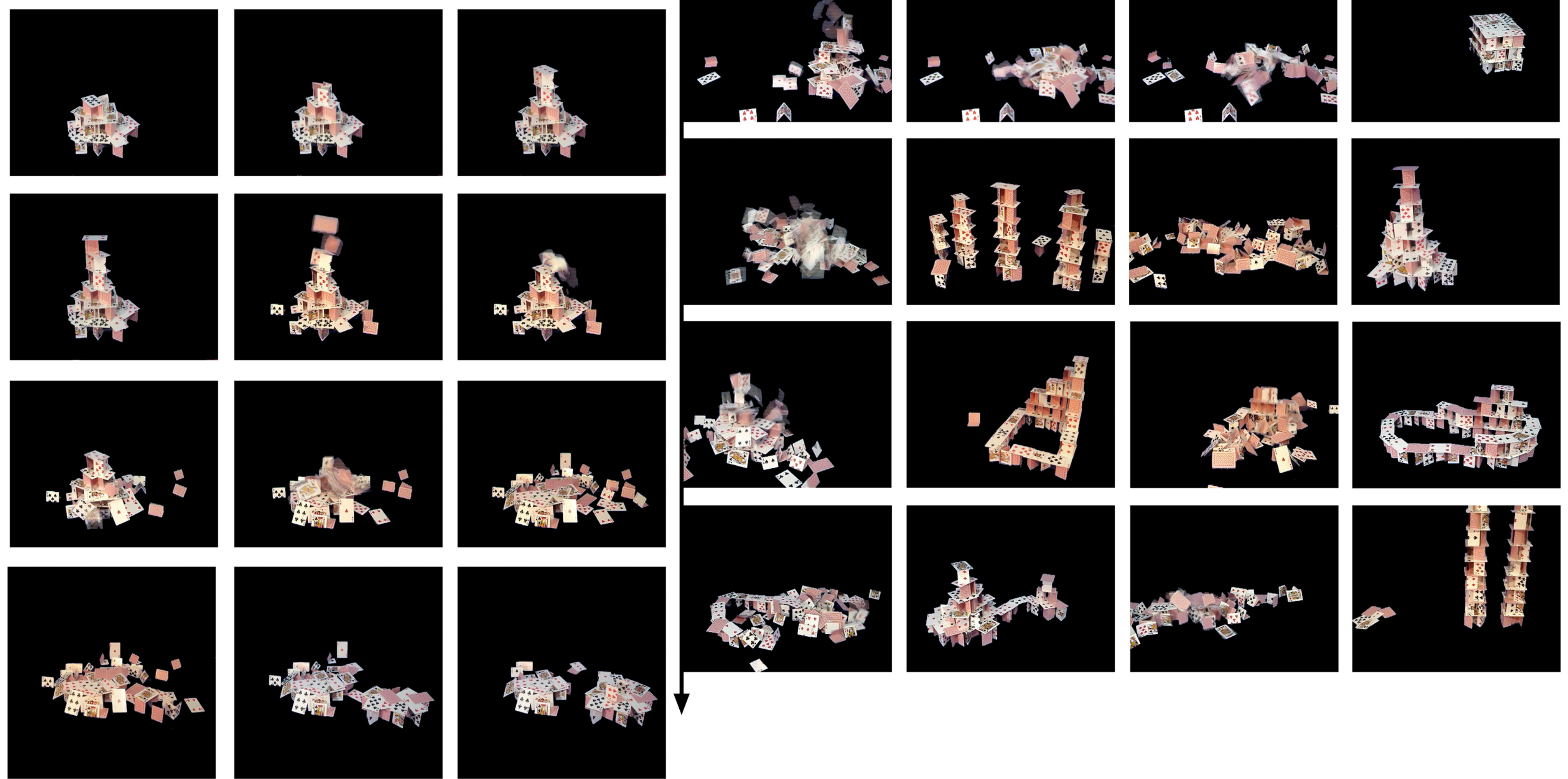
It's from here that new evolutions (in form) arise. Through a range of simple gestures such as rolling, folding, scrunching, stacking etc. a range of previously unknown potentials (to the project) manifest from the A4 mould. Through utilising the defined visual algorithms of the project (diffusion, fractals etc.) the assemblage becomes crystallised into an actual form.

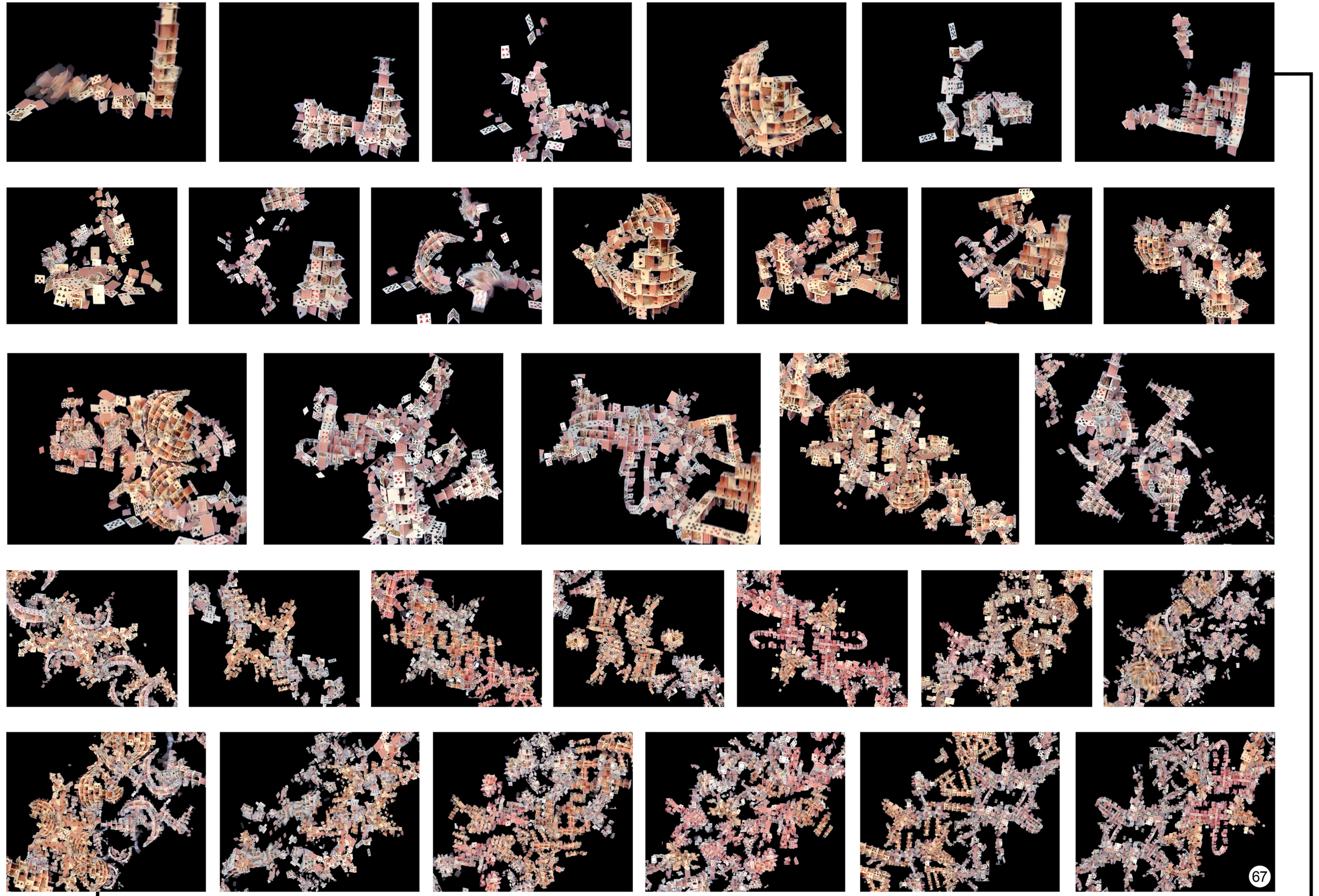
Assemblage 3 (10/09 a.c)

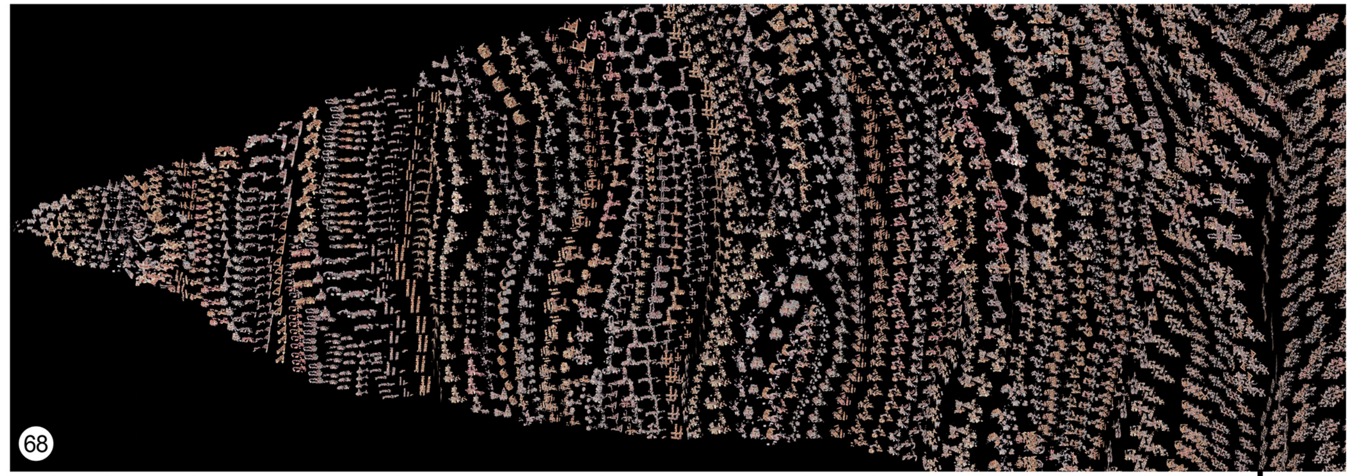
Assemblage 5 (03/10)’ has commonalities with the previously mentioned ‘Assemblage 3 (10/09 a.c)’ in the sense that its structural basis is derived from a singular moment in the grander assemblage’s history rather than an adaptation and extension of a compilation of interacting systems. The specific moment that ‘Assemblage 5 (03/10)’ utilises for its creation comes from a video piece in ‘Assemblage 1 (07/09 a.c)’. This video piece, emerging from the primary structure of 'Assemblage 1', plays out a narrative of construction to collapse then reform. Through the course of its five minute duration it also multiples into a series of bi-unifications as the initial stop/motion footage of the construction/collapse scenes gradually multiplies itself. The actual process involves the stacking and collapsing of various card castles forms, produced using one deck of cards.

Assemblage 1 {vid} component (7/09 a.c)





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Assemblage 5a (6/10 a.c)

'Assemblage 5 (6/10 a.c)' works with the still frames from the previously mentioned video piece, a component of Assemblage 1. Seen as a form of visual cataloguing, the new 'assemblage', is a 2-D photographic drawing that arranges the video frames into a new series of sequences. Flowing from top to bottom, each frame is mapped out sequentially, roughly following a larger pattern of the exponential. Once every frame is laid out, the total form emerges. This 'total form' is seen as an 'assemblage'. From this, new variations of organisation have potential to occur, continuing to modify the form until it, itself, goes through a phase transition to become another 'entity'.

Assemblage 5b (6/10 a.c)


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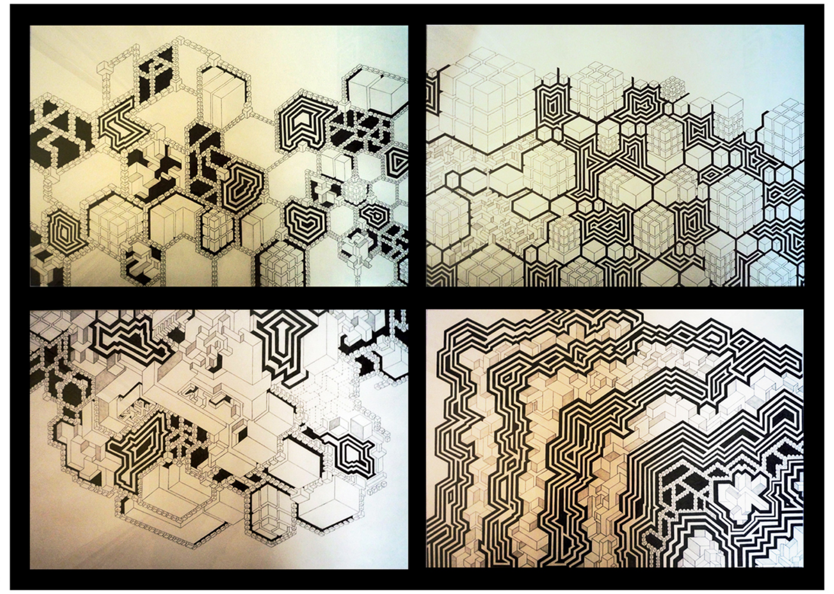
Assemblage 7 (3/10-6/10) illustrates the potential for new codes and systems in certain instances to (seemingly) appear without a source. The drawing series that make up Assemblage 7, while obviously emulating organisational systems underlying the whole project, is comprised of a grouping of elements that had no known basis within the project until its emergence. While eventually amalgamated into the larger project as a part to a whole, Assemblage 7 exists as a necessary exception in the general evolution of the project's 'sorting process'.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Assemblage 7 (3/10- 6/10 a.c)

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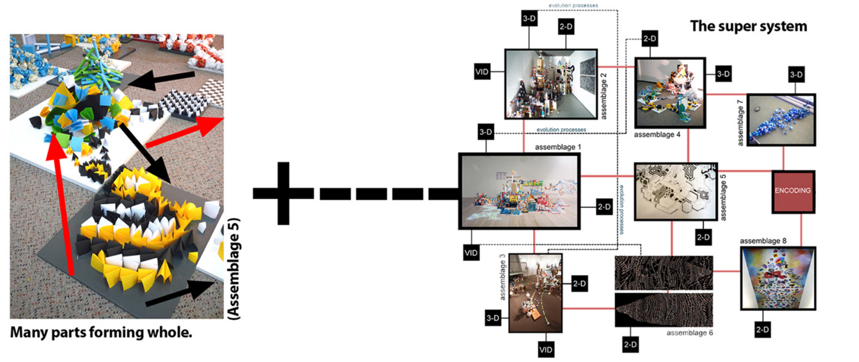
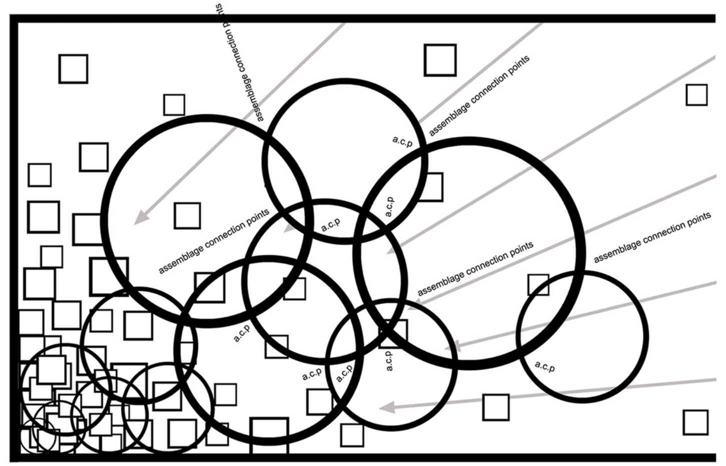
The Convergence

So far in this section a sketch has been outlined for how the 'sorting process' works as a methodological analogy for both the processes of construction and the form of construction itself. While more detail could be explained I feel the general picture has appeared and the laborious endeavour to define every detail of the 'sorting process' is unnecessary. In this final paragraph, a description will be outlined of how the 'series of assemblages' will converge in the final exhibition.



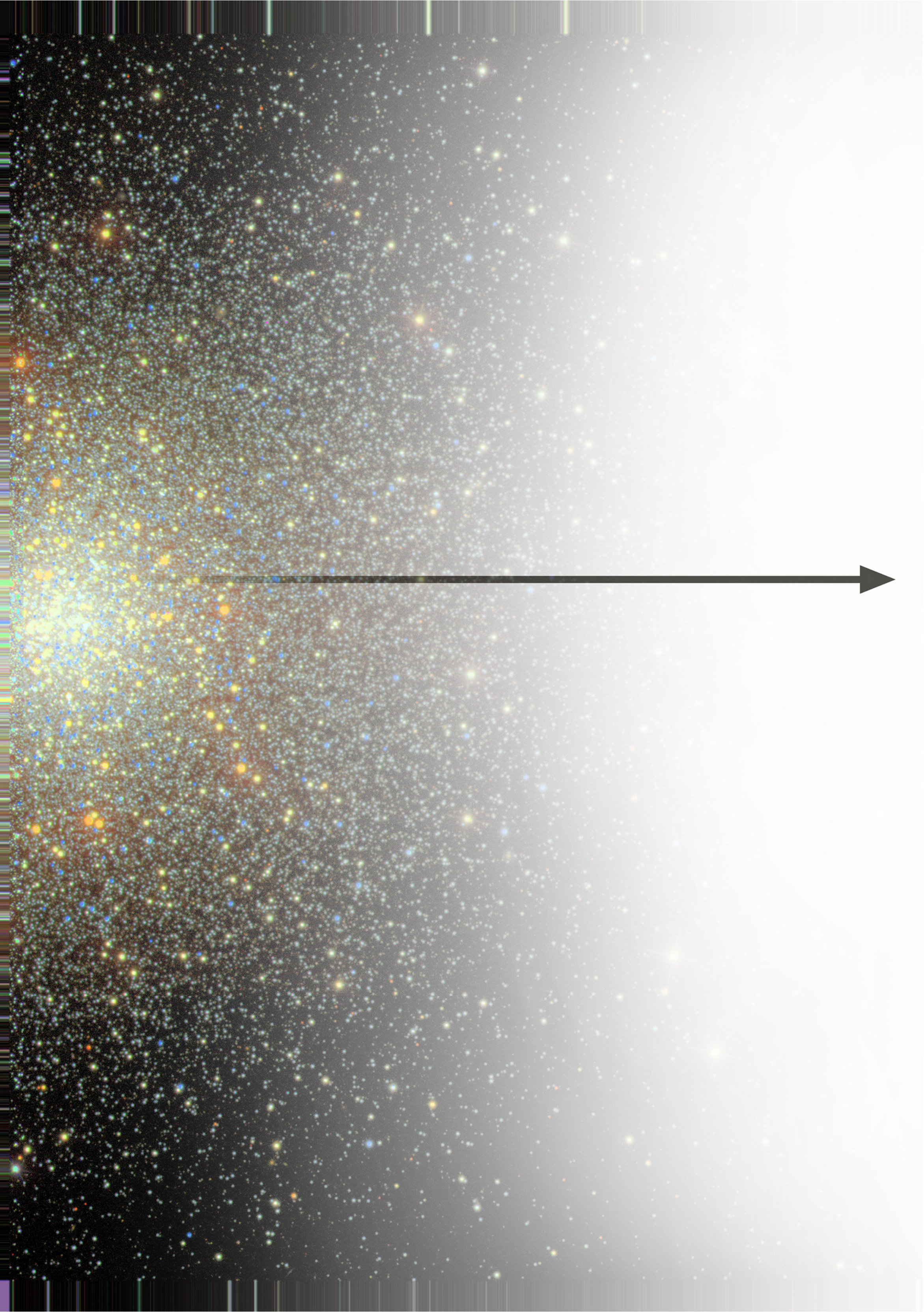
Many parts forming whole.

Abstracting from the general principals of the exponential, the final exhibition will create a series of interactions between the established 'assemblages'. While currently each 'assemblage' should be considered as many interacting 'parts' that form a whole, the final exhibition will bring all these 'assemblages' together to a form a 'larger whole' or in context to this project, the 'super system'. The fusing of these assemblages will follow organising principals contained in the construction of the 'smaller parts' as already outlined in the sorting process section and in this chapter in general. To repeat, these include grafting, diffusion, mass/ fragment etc.

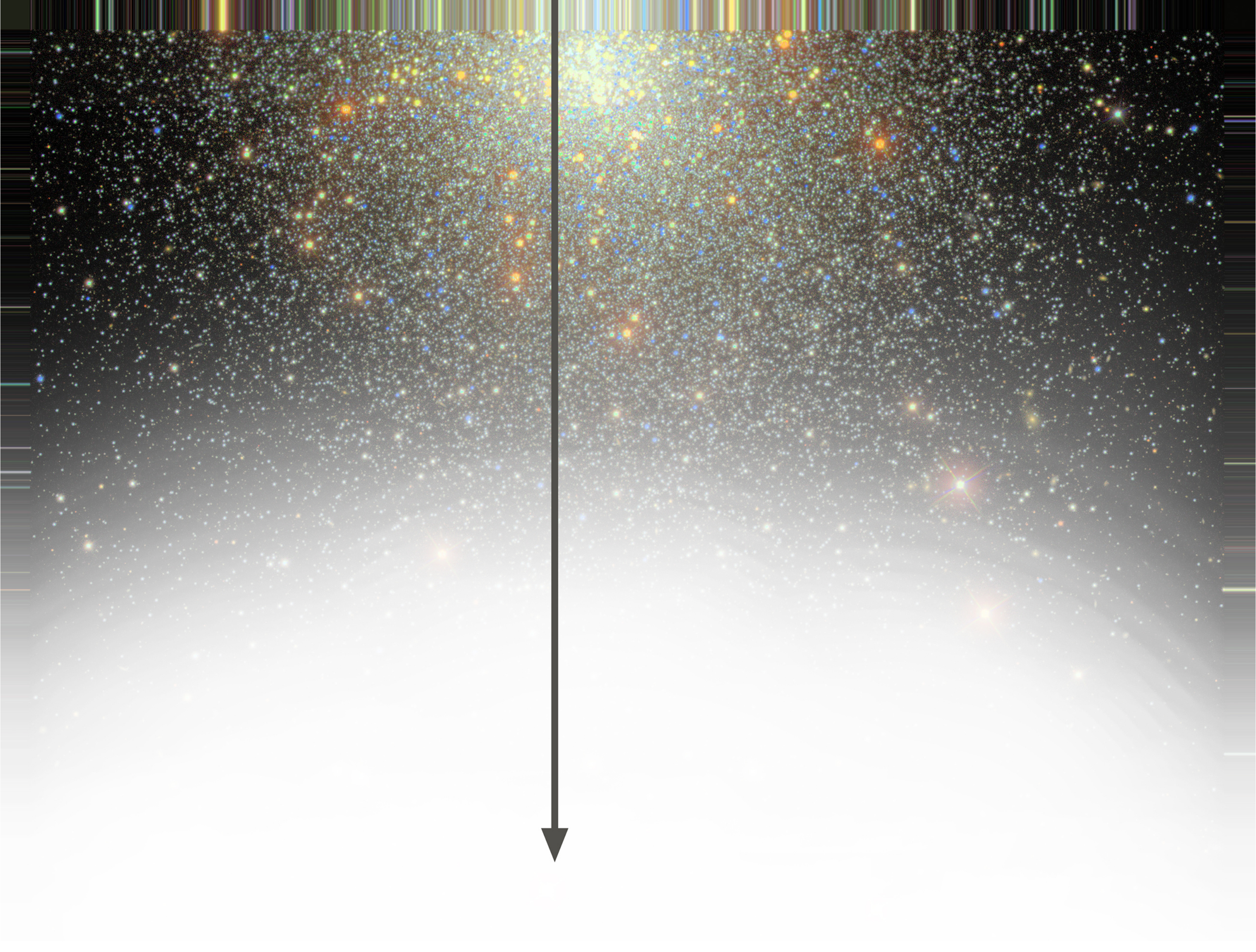


Diagrammatic Gallery Plan

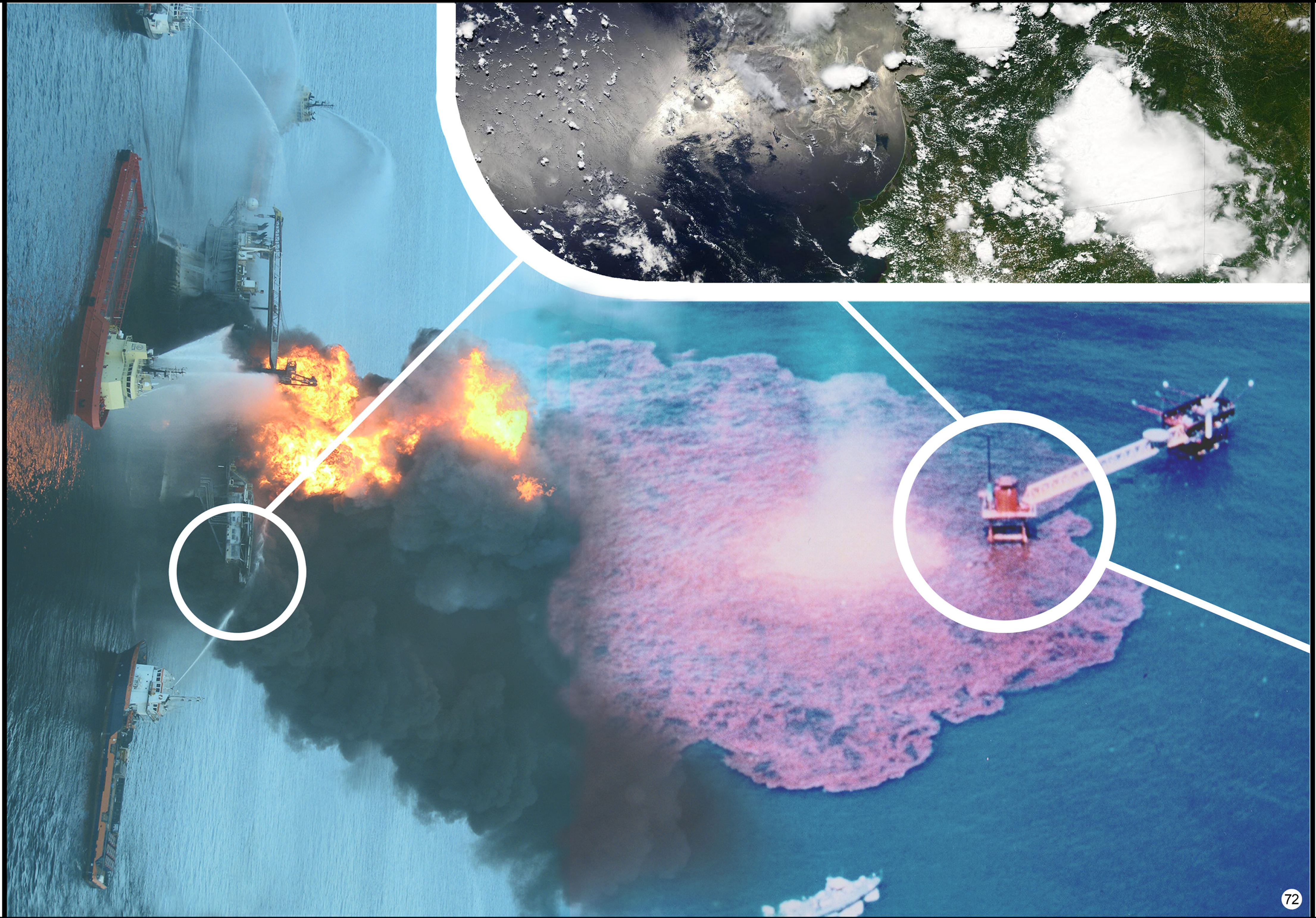
However, unlike the creation of the 'assemblages' so far, an underlying guiding component directs the total form: exponential growth. The emergence and convergence of the parts will follow this simple yet complex formula, as the assemblages and their connections build over the course of the gallery space culminating in a extreme point of density where the artworks pile up to a state of overload.



expansion point

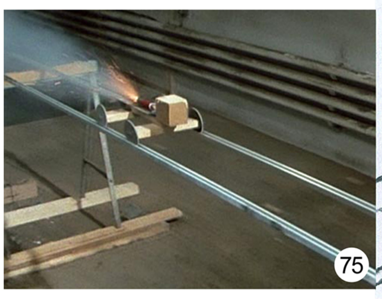


expansion point



Just like the shift between the calm dramatic pauses and predictably unexpected climactic change in 'The Way Things Go', accidents too have a state of pattern and order to them. To understand technological usage on a grand scale and as part of its own natural sorting process; the accident is something implicit that will eventually rise to the surface. It's only the where and when that's unpredictable. So we wait glued to our global informational source – whatever that may be – calmly mesmerised, waiting for the next instalment in the global accident. While on a small scale the repercussions are less obvious, the larger and more interconnected the disruption to our technological foundations are, the more non-linear, chaotic and far-reaching the effects will be.

Peter Fischli and David Weiss's 'The way things go' (1987) is an epic cascade of chain reactions. From kinetic projectiles to chemical reactions, steam powered forces to flame generating domino effects, it is in its essence a series of accidents that connect to create the next.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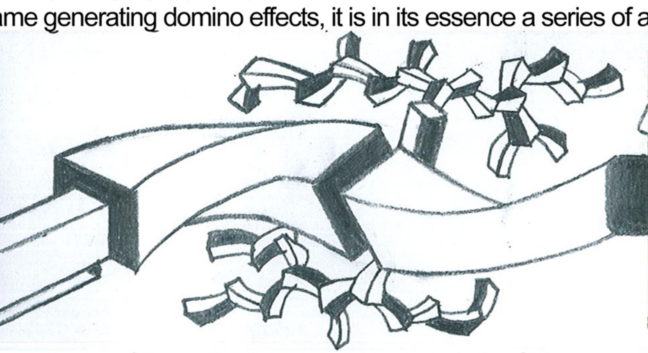

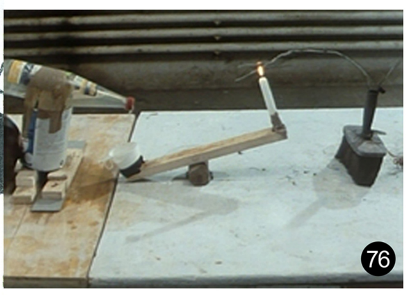
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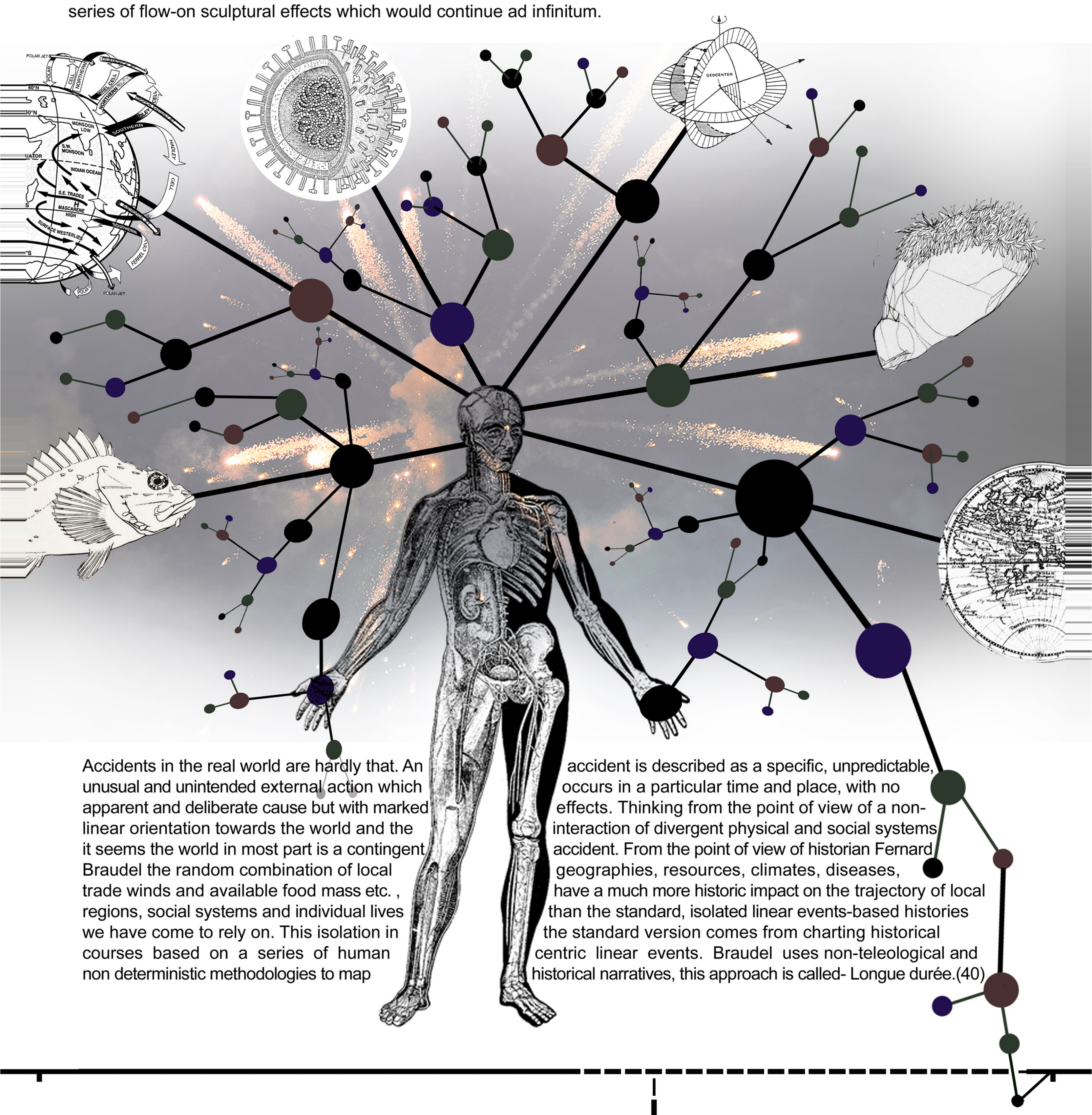
While having the appearance of a degree of linearity, this sculptural sketch of 'the way things go' is better understood as a series of non-linear dynamics that have been isolated from a crazier and chaotic whole to highlight the internal interconnected nature of physical systems. You could easily imagine each moment of exchange multiplying into a series of flow-on effects all with their own individual and particular outcomes. Each one of these multiples would also have a series of flow-on sculptural effects which would continue ad infinitum.



Accidents in the real world are hardly that. An unusual and unintended external action which apparent and deliberate cause but with marked linear orientation towards the world and the it seems the world in most part is a contingent Braudel the random combination of local trade winds and available food mass etc., regions, social systems and individual lives we have come to rely on. This isolation in courses based on a series of human non deterministic methodologies to map

accident is described as a specific, unpredictable, occurs in a particular time and place, with no effects. Thinking from the point of view of a non-interaction of divergent physical and social systems accident. From the point of view of historian Fernard geographies, resources, climates, diseases, have a much more historic impact on the trajectory of local than the standard, isolated linear events-based histories the standard version comes from charting historical centric linear events. Braudel uses non-teleological and historical narratives, this approach is called- Longue durée.(40)

The way things go.

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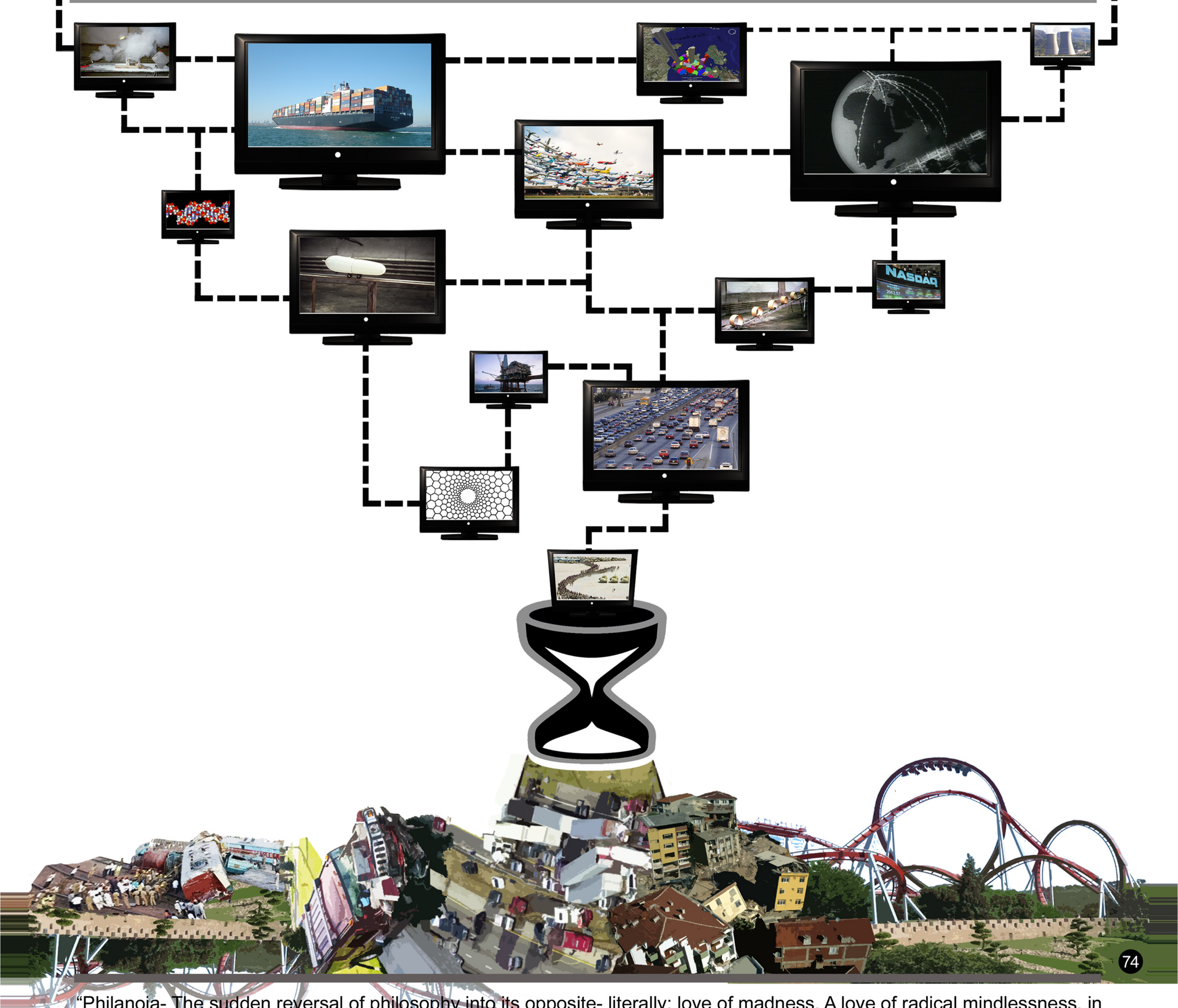
But in our world today the accident is mainly understood in technological terms. Natural disasters are only really disasters (at the least within public awareness) when they have an impact on us; this really means when they influence our technological substratum. Paul Virilio's writings constantly make reference to the technological accident. He describes a technological world similar to the visual chain reactions of Weiss's and Fischli's sculptural narrative. In this world is a myriad of technological interconnections both in the physical states of these systems and in the connection and restructuring that occurs within our lived subjective lives. Virilio calls this the integral accident. Globalisation (not just in ideological terms but also perceptive), speed, information density, genetic engineering and the virtual become a new set of processes which emerge from our technological machinery. These dynamics have their own non-linear causality and Virilio's texts attempt to sketch them out or at the very least make apparent the state of philanoia he describes we find ourselves in.(41)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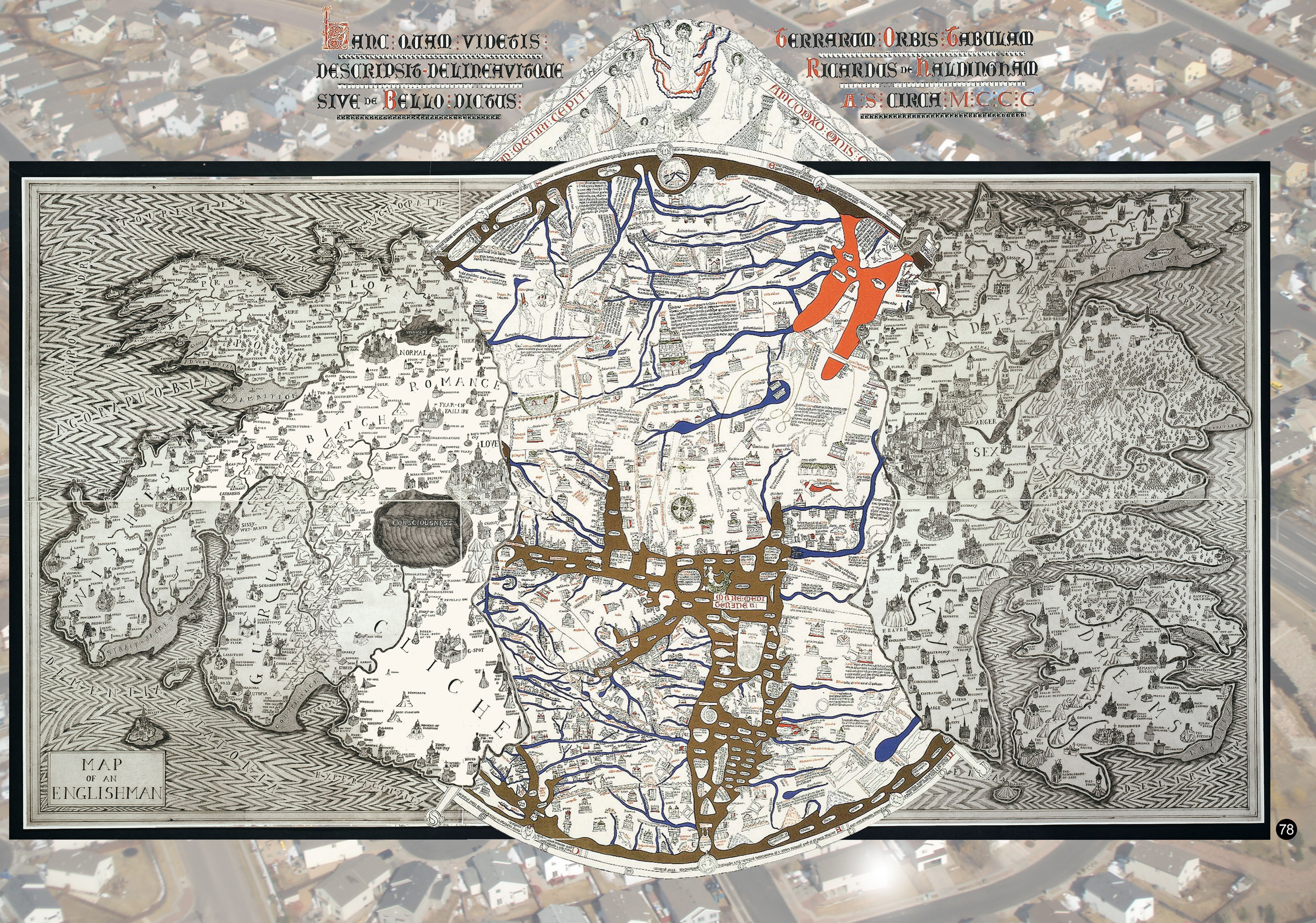
"Philanoia- The sudden reversal of philosophy into its opposite- literally: love of madness. A love of radical mindlessness, in which the insane character of our acts would not only cease to worry us consciously, but would delight and captivate us." (42) In the media roller-coaster of virtual perceptions and an omnipresent events-based world the disaster is prime time entertainment; an accident inside an accident Virrilio would say. But is the accident something more implicit rather than unintended? "To invent the ship is to invent the shipwreck. To invent the train is to invent the derailment. To invent the private car is to produce the motorway pile-up....The airplane is to invent the plane crash."(43) Not to mention the stock market crashes, oil rigs, nuclear reactors, Hi- Tech food production, oil dependant economies etc. For Virillo the grander the technology the more epic the accident.

The Hereford Mappi Mundi is an exemplary example of the methods and worldview of the medieval cartographer. Fusing reality with fiction the final result exists somewhere in between a geographical interpretation of land mass and a folk lore of tales of the lands beyond. As the mapping moves beyond the central proximity of the location of creation the unknown becomes exposed to the modern mind as commonly uncharted locations and enclaves become filled with weird and wild creatures. From dragons to giants to human/animal mutations, this map (which continually skews and distorts overlayed topographical features) represents a form of 'collective subjectivity' that shows the community's knowledge and networks under the rubric of the superstitious religious worldview of the time. This map is a combination of a perceived objectivity with the internal conditions and concepts which define the medieval mind and shape their experience within time and space. More specifically the map grows out of a particular time and place representing a form of ontological knowledge which as a dynamic literally grows out of itself; emerging from the centre of conception, where knowledge (known entities) is more stable to the outer liminal limits where the real merges with the fictitious.

Grayson Perry and Simon Evans have both produced work that refer to this approach to mapping time and space. Moving beyond the modern desire for universality and objective frameworks, aspects of their work return to the medieval inclination (although more consciously) of mapping more subjective (human-centred) modes of experience within contemporary time and space. In his delineation of post-modern time/space conditions, geographer and theorist David Harvey describes a world which presents parallels to the medieval relationship to space. Although completely different in the majority of features and dynamics relative to each time, Harvey's notion of a time/space compression alludes to a more subjective or perhaps fantastical set of networks that permeate the post-modern mind. In the dense informational flux that defines our contemporary environment, Harvey, in the chapter 'Time and Space' from the 'The Condition Post-Modernity' (1989), describes a world which is continually increasing and expanding while simultaneously shrinking and collapsing. Knowledge expands, becoming more specialised, rapidly increasing the limits of human exploration into all domains. Within this density and the technological interconnectedness it creates, the individual is caught up in a world which seems to collapse inwards. (44)

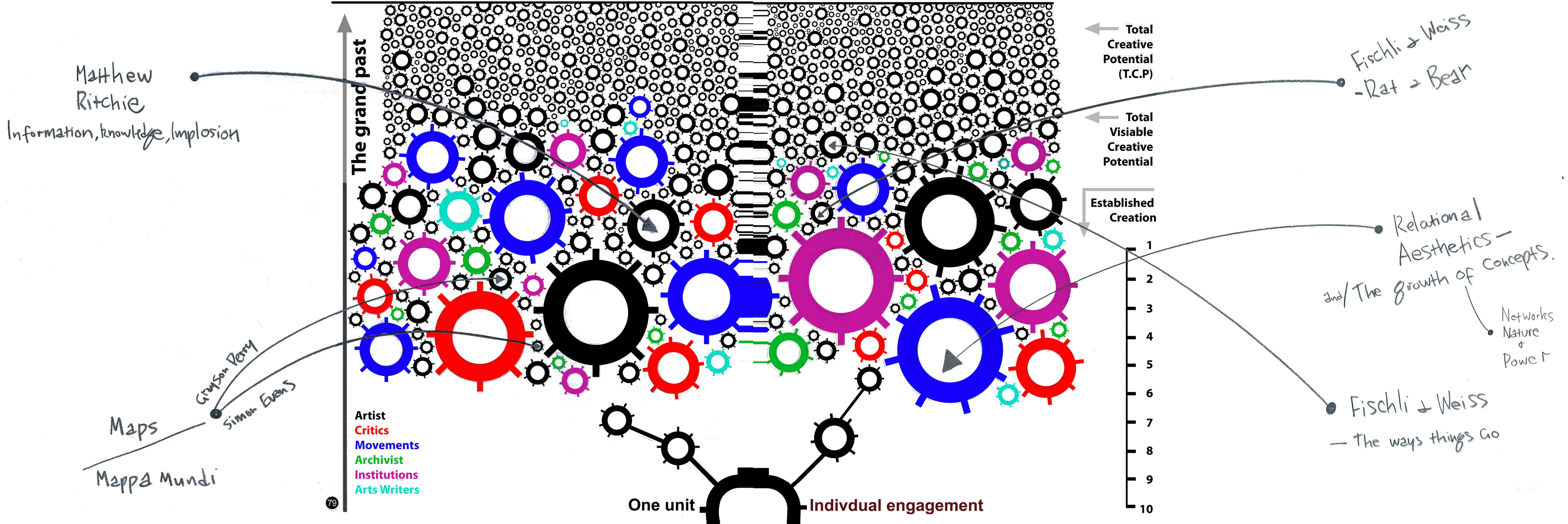
Perry and Evans' cartographic tendencies seem to express this collapse inwards in their delineation of more subjective contours and relationships to time and space. Like the medieval inclination (although working from vastly different lines), they present rhizomatic representations of the more superstitious (or perhaps idiosyncratic is a better term) conceptual frameworks people in the current epoch think through. Evans' map titled 'The World' inverses the objectivity of the standard encoded territory, replacing it with a common mass-produced suburban overlay. Within this framework a random set of judgements and orientations towards stuff is outlined, as any hope of holding a true image of the actual world is imploded. What remains is converted into: what I know or think. Perry occupies the same terrain in a similar way with his work titled 'Map of an Englishman'. This map, which appropriates the Mappa Mundi as a model to work from, defines its subjective nature from the very start. The cartographic space mapped by Perry focuses primarily on the internal rather than external. It's the realm of desire, habits and subjectification that has emerged within the male mind within a particular geographic and cultural space (England) according to Perry's own limited perspective.

Both artists implicate the immanence of human mental faculties in the conceptual construction and preceding orientation that occurs within environments.



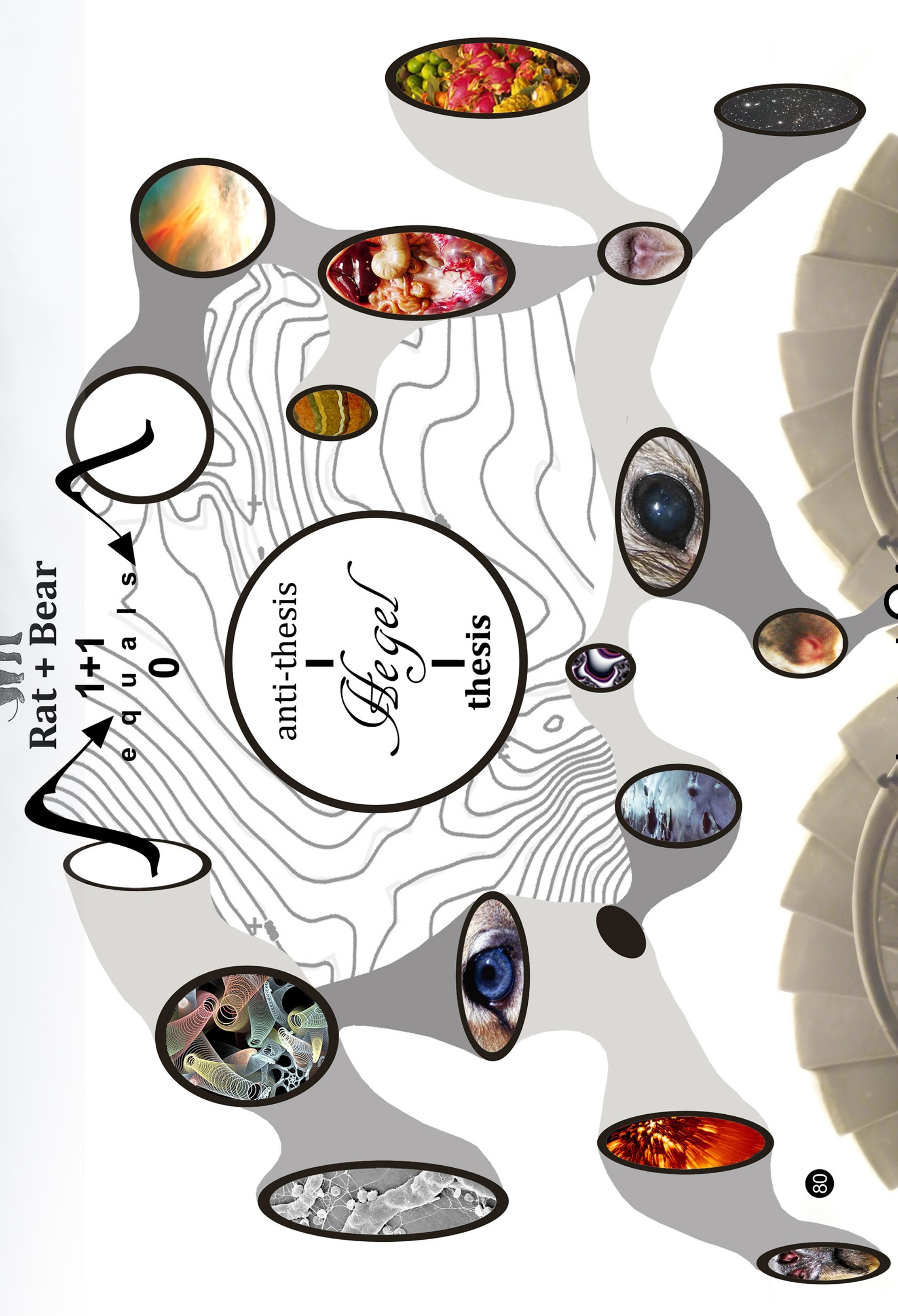
Contingency and Art

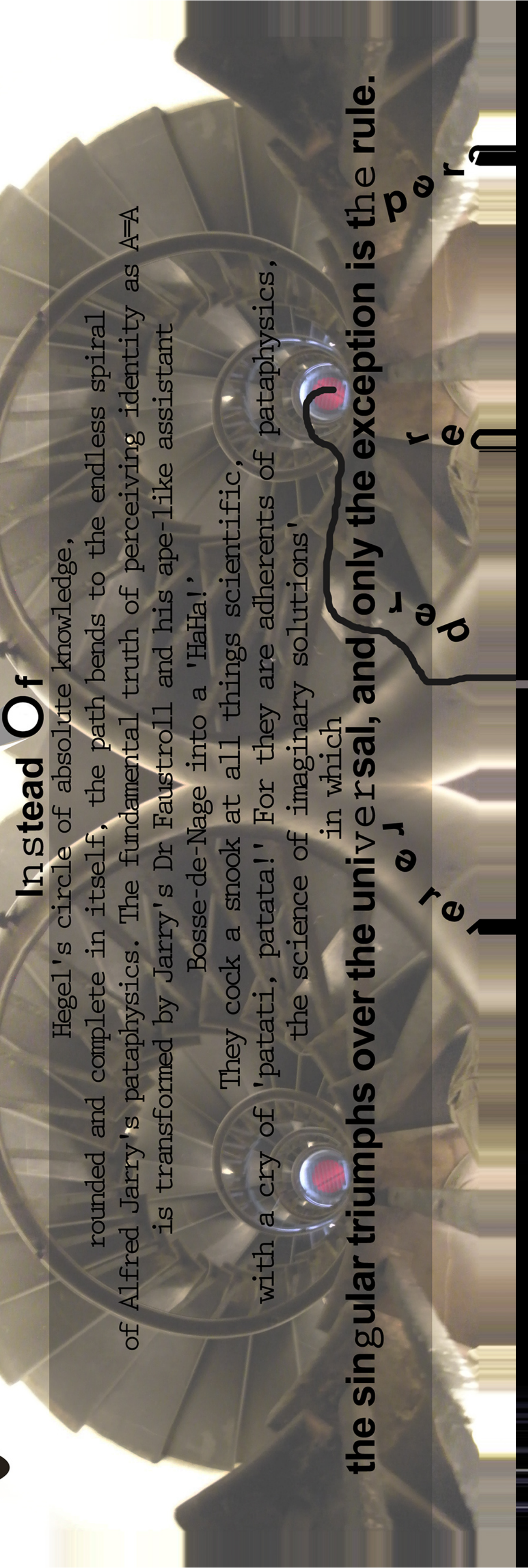
(the sorting process)



The following text is an extract from 'Flowers and Questions' (45) a book containing a series of essays on various artworks from the Swiss artists Fischli and Weiss. The text by Stefan Zweifel been selected and isolated due to its alignment with the pataphysical sentiment and the logic this operates by. The poetic description of Rat and Bears journeys "outside of the maze of conventional thought" parallels conceptual approaches to the exegesis.

There they sit, Rat and Bear, at the end of the film Der rechte Weg (The right way 1982-3). Like two 0s
high above the sea of fog, 'with clouds and sky about
them ringing'. Transposed into timeless distance, as
distant as the diction of the Romantic poets, as distant as childhood. The Rat swishes its
tail and we hear,
'resounding from afar', the shrill screech that we, as children, once teased
from brightly striped plastic pipes.
Rat and Bear: they are not two,
not 1+1, but as indefinable
and as incalculable as 0. They elude the
grasp of conceptual thought. They elude the urge to press opposites into a higher unity by the force
of dialectical
argument.





Instead Of

Hegel's circle of absolute knowledge,
rounded and complete in itself, the path bends to the endless spiral
of Alfred Jarry's pataphysics. The fundamental truth of perceiving identity as A=A
is transformed by Jarry's Dr Faustroll and his ape-like assistant
Bosse-de-Nage into a 'HaHa!'
They cock a snook at all things scientific,
with a cry of 'patati, patata!' For they are adherents of pataphysics,
the science of imaginary solutions'
in which

the singular triumphs over the universal, and only the exception is the rule.

Rat and Bear thus find a space between concepts, between opposites- delving into the realm of childhood, on the highmoor of that pre-genital joy that prevails before the all-divisive gulf of gender difference. Sub-ject and ob-ject are no longer enemies on their shared tra-jectory through the world. Time and again, they softly, softly touch the circles of knowledge, and flee into uncertainty. . . .

EebrBR BACK FRONT

epSE SUBJECT OBJECT

dmedED EXTERNAL INTERNAL

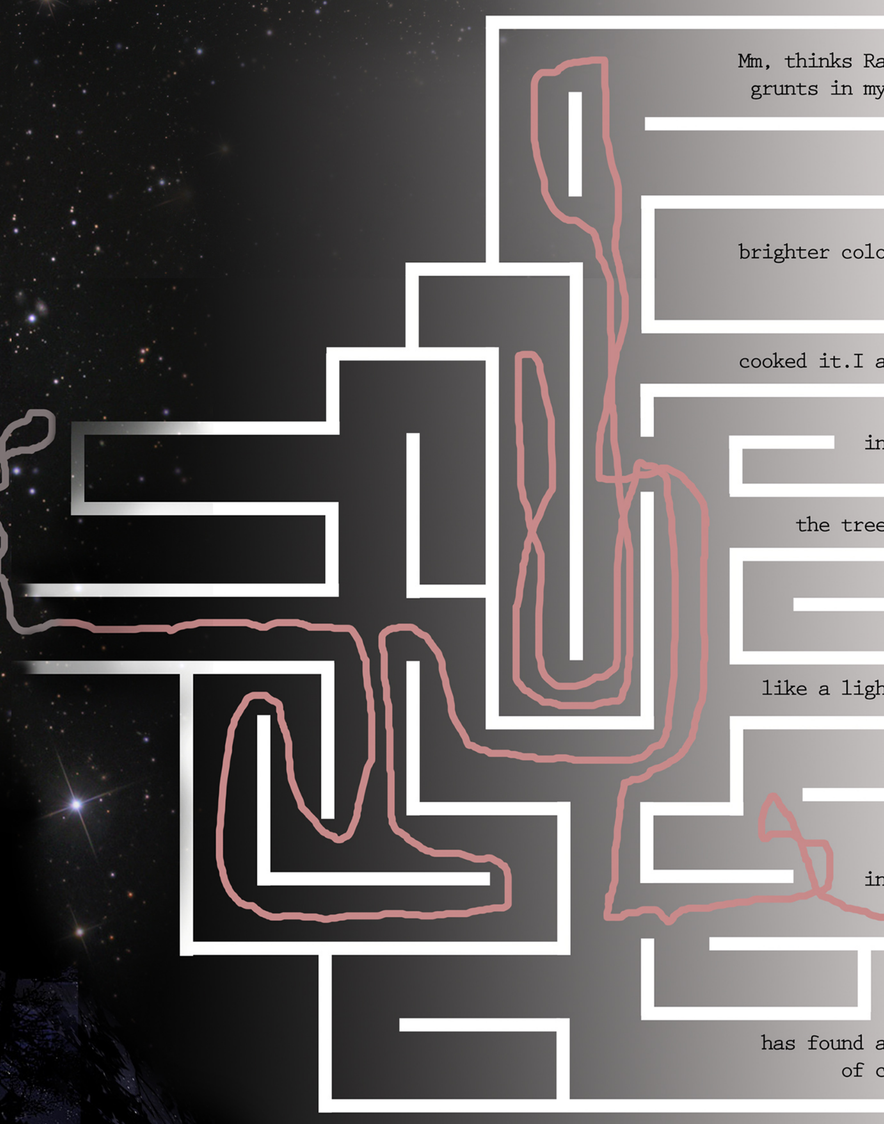
UP DOWN

EdmemE MALE FEMALE

INSIDE OUTSIDE

WHITE BLACK

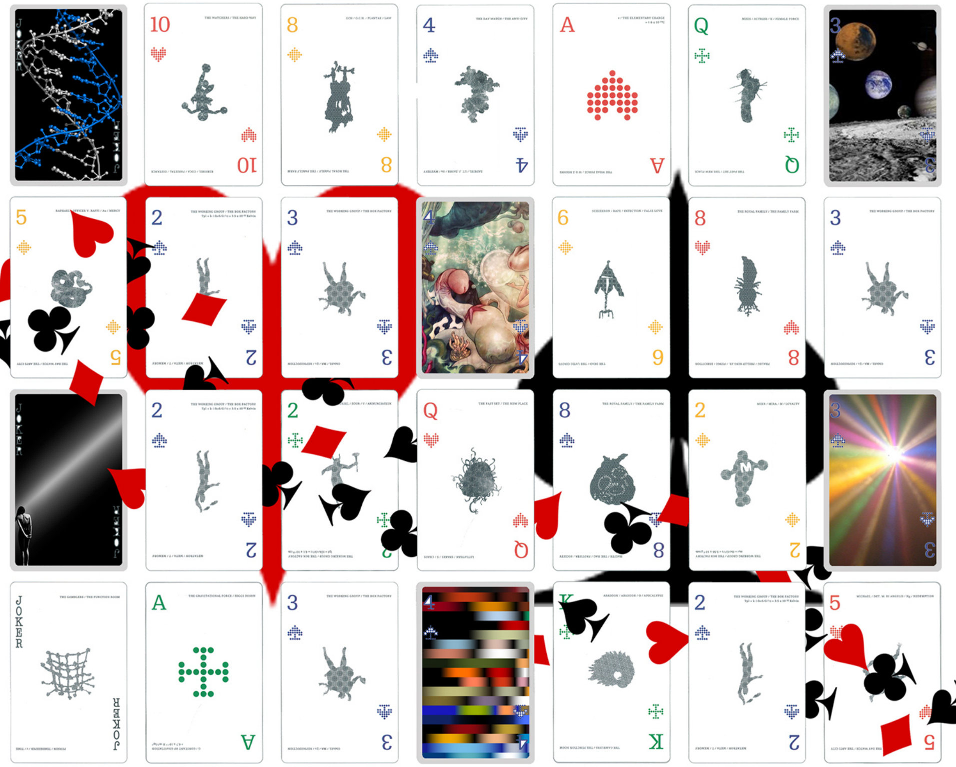
Just one more
little dance; how nice
it is to dance with your paws in the
mossy heather, thinks the bear as he circles around
his own axis, tilting gently like the earth. Oh! How lovely to
feel the waters of the moor washing around
my paws, highest and lowest converging! Here I am barefoot, paws in
the mud, head in the sky, growing up and up beyond myself as in a
dream, looking down at the trees,
my head swaying like the moon across the sky.
Yes, I am like the moon that waxes and wanes-
I am the Uber- Bear.



Mm, thinks Rat,how warmly the pig
grunts in my belly, how my brain
becomes a
whirling
humming-top
that spins
in ever
brighter colours through my mind.
I have hunted down
the pig,
nurtured and
cooked it.I am more than the sky-
I am the
universe
in all it higher order
and endless calm.
I have turned
the tree trunks heavenwards;
their
roots are
outlined
against
the sky
like a lighting flash. And this
root-flash
begets the
animals.
I hold the
formulae
of the world
in my hands and I draw
them
in
the book.
I am the
laboratory rat that
has found a way out of the maze
of conventional thought.
(45)

Matthew Ritchie- Information, Knowledge and Implosion.

Matthew Ritchie creates worlds of complex interactions; form, pattern and signifier compiled into swirling and disorienting installations. His work is a fusing of knowledge structures which attempts to represent the conditions of any system. Light, colour, mass, space, time, solitude, DNA and sex are all intermingled in a categorised visual scheme. His installation titled 'The Propositional Player' (2003) uses the motif of the deck of cards to organise this information, hijacking its original hierarchy of encoding and supplementing it with a new one. Chance, gambling, rules and narrative still remain, however, in the 49 card-based system which finds further divisions in the seven functions these initial categories exist in. These seven functions include the scientific, dynamic, personal and theological and they each contribute to a dense informational layering system which is the essence of Ritchie's



This informational system and its operation is explicitly post-modern. Less an explosion of knowledge and information than an implosion in its influx and density. It is ramshackle yet clean and shiny, transparent yet opaque, stitched together loosely but simultaneously tight; an entire environment to enclose one's senses and self within.

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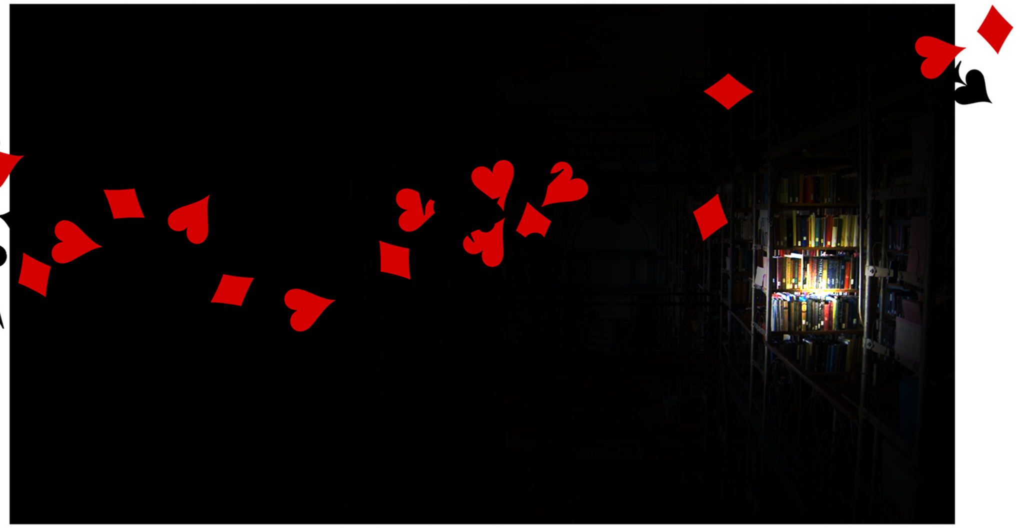
'The Propositional Player' is Ritchie's largest-scale effort to date, and like the Sistine Ceiling, it creates an entire environment that cannot be taken in with a single glance, but rather invites walking in and around and pursuing. However, while a sixteenth-century viewer could, to some extent, "read" or "know" the stories portrayed in Michelangelo's epic installation, Ritchie's tales remain more abstract and elusive to his twenty-first-century viewers. (46)

Ritchie's omnivorous visual system shares a similar sentiment to the antics and adventures of Gustave Flaubert's characters Bouvard and Pécuchet, chief protagonists of a satirical novel by the same name. Published a year after his death, this unfinished text spent many years in production. Obsessed, Flaubert claimed to have read nearly 1500 books in preparation for writing it; similar to Ritchie, Flaubert engrossed himself in the latest scientific explanations of his time. The story of Bouvard and Pécuchet follows their adventures after they inherit a sizeable fortune and move to the countryside. Their search for intellectual stimulation leads them, over the course of years, to meander through almost every branch of knowledge. (47)

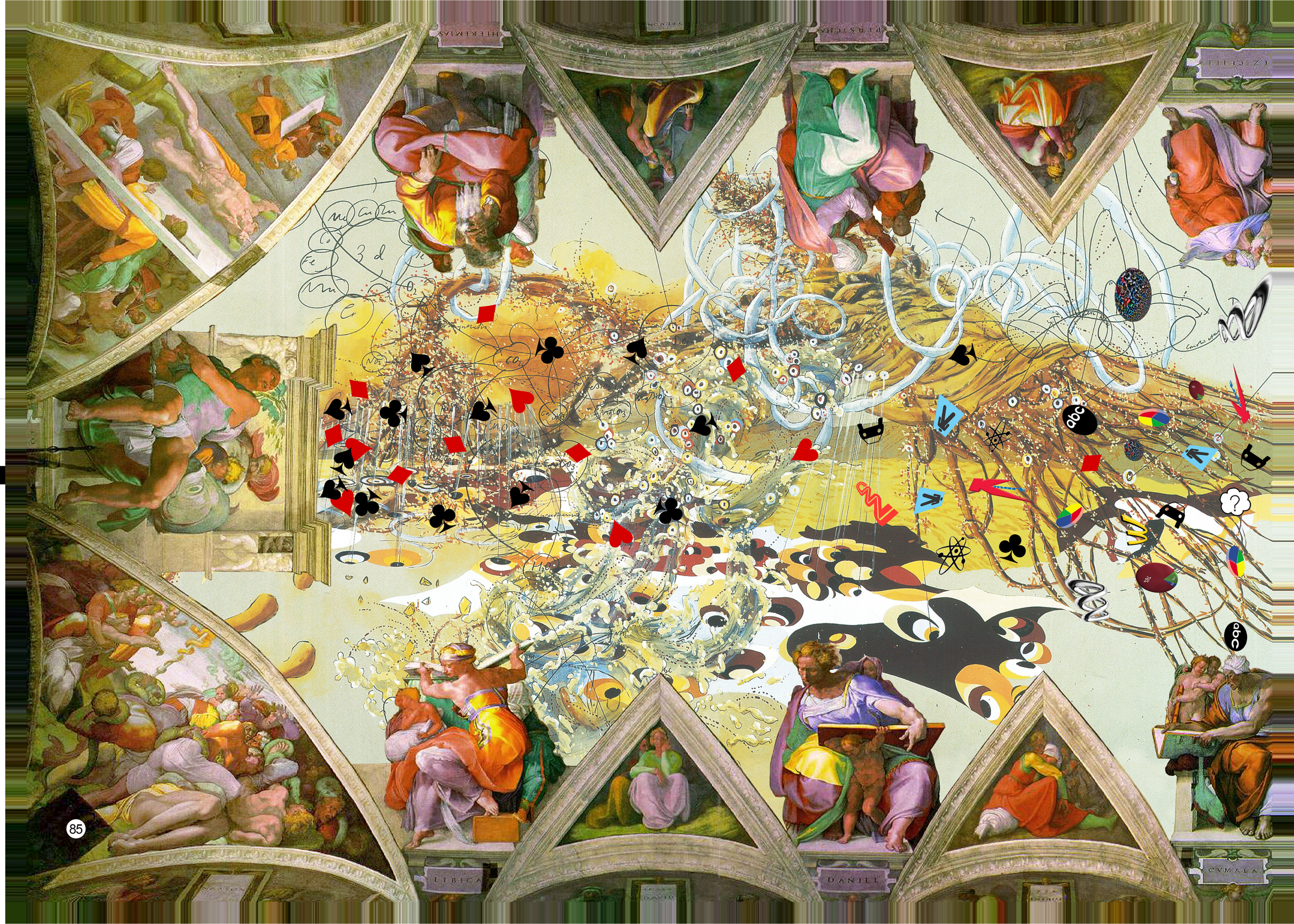
Much like Ritchie's categories and divisions of functions, Flaubert divided his chapters into the areas of enquiries the protagonists chronologically pursued. From agriculture, chemistry and medicine to grammar, love and theology every attempt to solidify their research into fruitful outcomes fails. While it's not so much a comment about the particular details and plausibility of scientific advancements for the time, Flaubert does attempt to expose weaknesses in the arts and science. In their enthusiasm, the two characters intertwine themselves with the encoding of the disciplines being pursued; they constantly confuse signs and symbols for reality.

In a similar way, Matthew Ritchie's work is obsessed with the human subject as navigator of over-produced meaning, leaving one to create paths and decisions based on minute fractions of the whole. While Bouvard and Pécuchet represent the mental image of the average person's enquiries of Flaubert's time, Ritchie's contemporary zeitgeist moves with a different size and pace. He suggests that

You or I might be able to find out about 5% in our entire lifetime of all human knowledge. Now can we use that knowledge all the time? No, it would be amazing, but we can't. We can probably use oh, 5% of that in our lives. And then when it comes down to it, you probably make a decision based on about 5% of the 5% of the 5% of the 5% of the universe. And you're pretty confident that that decision is a really good decision. You say, that's what I'm going to do today with my life or in this relationship or with this financial decision. And you're basing that on .00625% of the universe. And you're totally confident that you're somehow connected, because you are. You are connected to that 100%. (48)



Flaubert's transformation of the entire encyclopedia of human knowledge into a labyrinthine maze of utter non-sense is a pre-cursor to Alfred Jarry's character Dr Faustroll and his assistant Bosse-de-Nage, whose exploits send them on a multi-versal journey through the technological paradigms of their day. It also echoes Jean Baudrillard's own pataphysical enquiries concerning 'the masses' or what he also defines as the silent majority. Borrowing from scientific areas of enquiry including biology and physics, Baudrillard concocts a different slant on the modern discourse of sociology. In this vein Baudrillard explains his insights into the dynamics of information and the masses in contemporary society.



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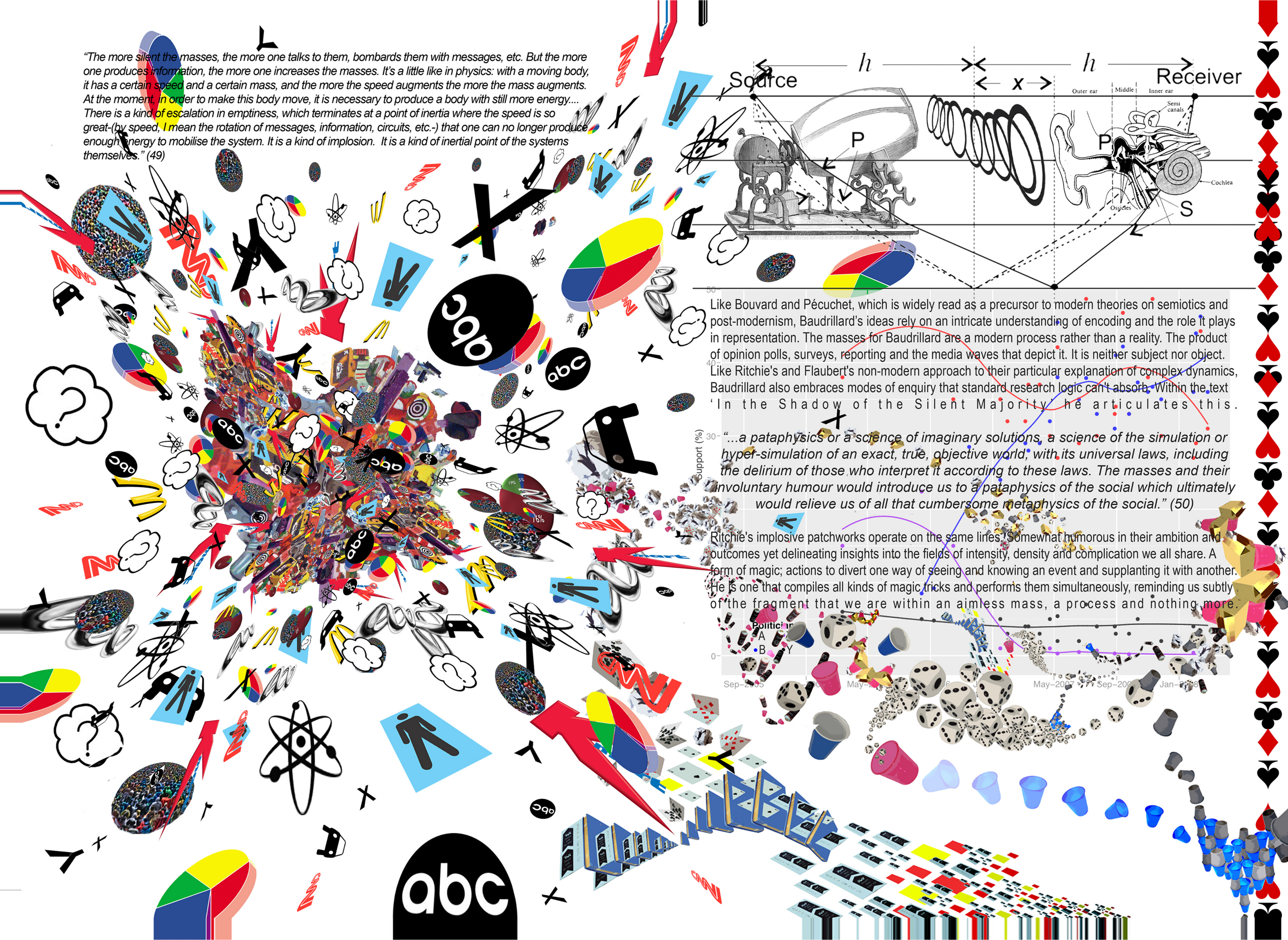


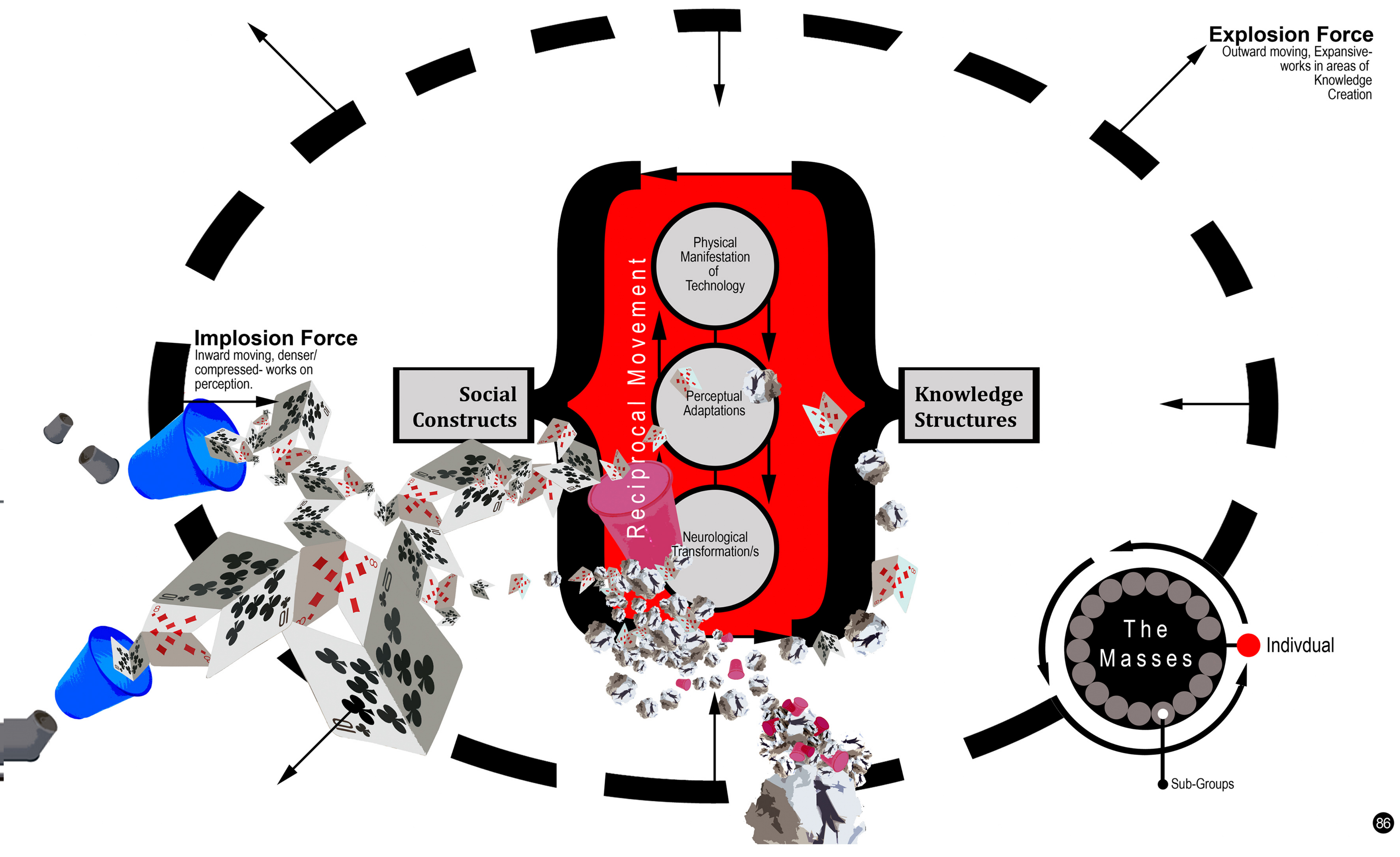
"The more silent the masses, the more one talks to them, bombards them with messages, etc. But the more one produces information, the more one increases the masses. It's a little like in physics: with a moving body, it has a certain speed and a certain mass, and the more the speed augments the more the mass augments. At the moment, in order to make this body move, it is necessary to produce a body with still more energy.... There is a kind of escalation in emptiness, which terminates at a point of inertia where the speed is so great-(by speed, I mean the rotation of messages, information, circuits, etc.-) that one can no longer produce enough energy to mobilise the system. It is a kind of implosion. It is a kind of inertial point of the systems themselves." (49)

Like Bouvard and Pécuchet, which is widely read as a precursor to modern theories on semiotics and post-modernism, Baudrillard's ideas rely on an intricate understanding of encoding and the role it plays in representation. The masses for Baudrillard are a modern process rather than a reality. The product of opinion polls, surveys, reporting and the media waves that depict it. It is neither subject nor object. Like Ritchie's and Flaubert's non-modern approach to their particular explanation of complex dynamics, Baudrillard also embraces modes of enquiry that standard research logic can't absorb. Within the text 'In the Shadow of the Silent Majority' he articulates this.

> *"...a pataphysics or a science of imaginary solutions, a science of the simulation or hyper-simulation of an exact, true, objective world, with its universal laws, including the delirium of those who interpret it according to these laws. The masses and their involuntary humour would introduce us to a pataphysics of the social which ultimately would relieve us of all that cumbersome metaphysics of the social." (50)*

Ritchie's implosive patchworks operate on the same lines. Somewhat humorous in their ambition and outcomes yet delineating insights into the fields of intensity, density and complication we all share. A form of magic; actions to divert one way of seeing and knowing an event and supplanting it with another. He is one that compiles all kinds of magic tricks and performs them simultaneously, reminding us subtly of the fragment that we are within an aimless mass, a process and nothing more.

The Techno-Verse



Explosion Force
Outward moving, Expansive- works in areas of Knowledge Creation

Implosion Force
Inward moving, denser/ compressed- works on perception.

Social Constructs

Reciprocal Movement

Physical Manifestation of Technology

Perceptual Adaptations

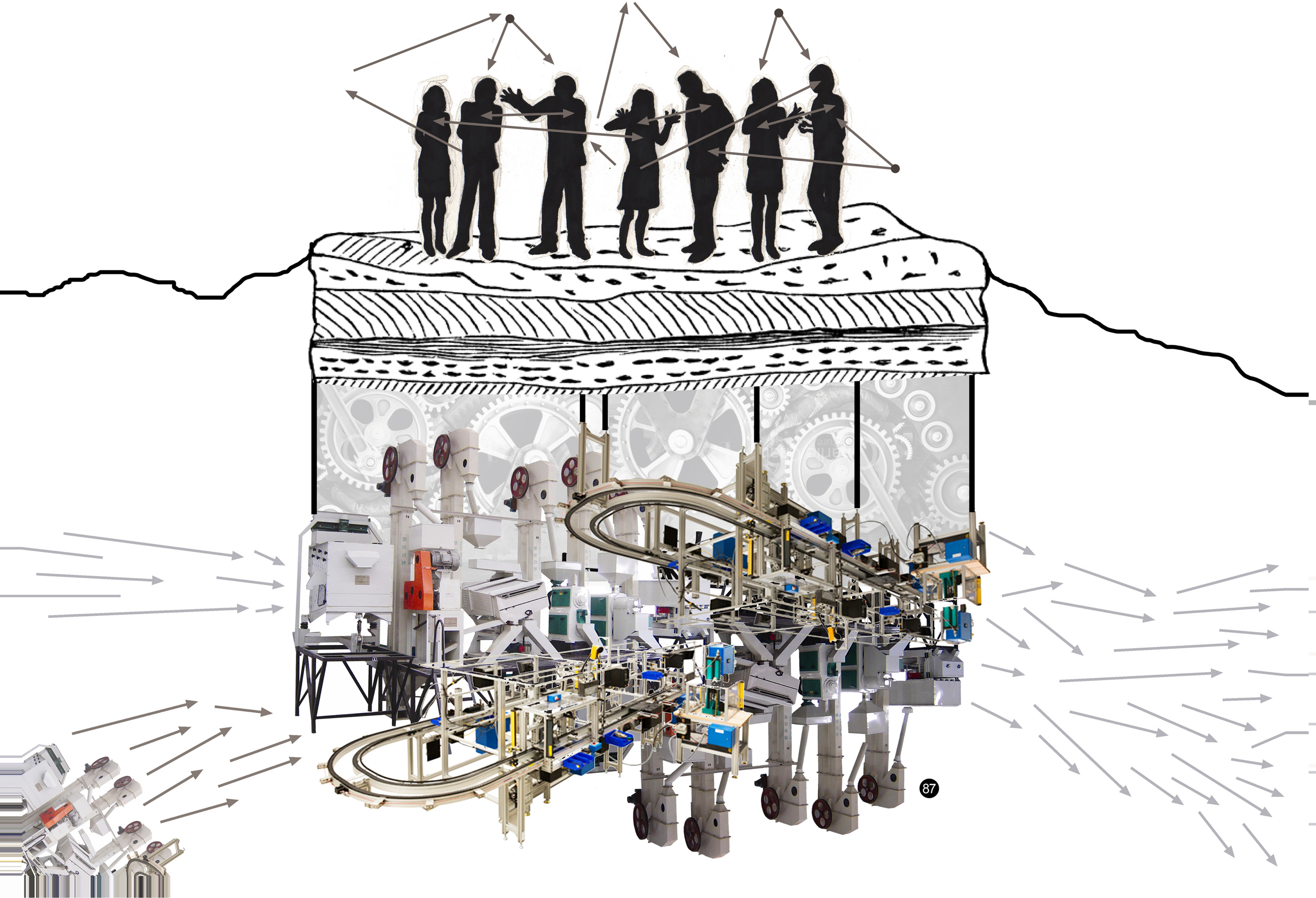
Neurological Transformation/s

Knowledge Structures

The Masses

Indivdual

Sub-Groups



Relational Aesthetics, the Growth of Concepts and the Sorting Process-Pataphysical approaches to understanding Contemporary Assemblages.

Exploring 'pataphysical' approaches to the understanding and analysis of contemporary assemblages, this section will outline the 'underlying' connections and the embedded importance of structural phenomena (or meta-processes) with the emergence of (aspects of) the assemblage titled the ‘relational aesthetics movement’. The relational aesthetics movement (as defined by critic Nicolas Bourriaud) understands itself as “a set of artistic practices which take as their theoretical and practical point of departure the whole of human relations and their social context, rather than an independent and private space.” (51) Relational art produces human relations. It could be seen as a crystallisation of various loose strains of artistic sentiment that existed in many guises through the 20th century from fluxus to conceptual art.

The ‘structural phenomenon’ this study acknowledges in the construction of the epiphenomena of relational art primarily focuses on: the exponential growth of concepts (akin to technology); symbiosis; the meme (replicating cultural genes); and the tendency for natural/human systems to form dense well-connected (in a human context), undemocratic socially stratified networks. The following connected section ‘Nature, Pattern and Power’ extends this discussion by examining this material process (of top heavy power concentration) as a tool to understand the art-world and its mechanisms, simultaneously contributing to a larger dialogue about technological growth formations occurring within the project. The analysis combines these processes as a source for explanation, privileging them over the conscious statements of artist and curator. From this a new understanding is offered which denies the motivation of a collapse of art and life pursued by relational artists, such as Rirkrit Tiravanija. Instead this study favours a focus on the 'artistic/sorting mechanisms' inherent within art’s grander structure. This structure always grants artistic production a unique position detached from life, an inherent contradiction in the work of Tiravanija.

Robert Anton Wilson has written extensively on the exponential growth of information, which works in a similar and codependent way to technology. The jumping Jesus phenomenon is the name that Anton Wilson uses to denote this tendency.(52) Anton Wilson works from the idea developed by Polish mathematician and founder of general semantics, Alfred Korzybski, which describes how information is doubling faster and faster with every generation. Korzybski took the year 1 A.D. as his basic unit to calculate how long it took for the information available to human beings to double, and it took 1500 years bringing us up to the Renaissance. (53)

Anton Wilson called this unit a 'Jesus'. So according to Anton Wilson in 1 A.D we had "one Jesus", in 1500 we had "two Jesus". The next doubling only took 250 years, so already you can see the acceleration factor, and by 1750 we had "four Jesus". The next doubling took a hundred and fifty years and by 1900 we had "eight Jesus". The next doubling only took fifty years and by 1950 we had "sixteen Jesus". In 1960 in only ten years we had "thirty-two Jesus", by 1967 we had "sixty-four Jesus", and by 1973 we had "128 Jesus". Anton Wilson describes how the estimates since 1973 outline a yearly doubling which has in more recent times progressed to a doubling twice a year. (54) This information is itself in the past, so obviously today’s rate of acceleration and density has further increased.

Contemporary art of the twentieth and twenty-first centuries is one of the most fertile of discourses in the growth of concepts. It is in many ways defined by concepts, and as the parameters for assessing the validity of such concepts are ambiguous and ubiquitous there is a lack of constraint in its potential expansion. Many other areas of human inquiry are not so liberated in this sense. These growth cycles, while primarily implicated within the larger framework of the exponential, also follow other replicating tendencies found in the ‘meme’ or the replicating cultural gene.

The meme in this analytical context could be seen as a micro process over the macro; the macro being, (conceptual) exponential growth. The meme, being only concerned with self-replicating tendencies, works in parallel with the stratified tendency for (some) natural systems to form interconnected dense top-down frameworks, with power concentration forming in the most interconnected network/s. Forming these ‘connections’ of course increases its survival as symbiotic reciprocity, status, ego, sex =gene replication, power and recognition work to define the parameters of how one relates and adapts to this symbiotic process. Within the material world it’s not necessarily what you do or know but how well established your networks are that really matters. Once these networks develop, while generally in competition with another, they also work to retain and harbour the collective interest of the group: this means retaining certain cohesiveness within language, self-reflection and establishment of boundaries and fields to patrol/control. As relational art exists (generally) in a post-productive logic and also at a time of rapid information dissemination this allows for an increased sense of mobility in its replicating tendencies, which also contributes to its ubiquitous presence within contemporary arts trend based structure.

Inside the discourse and hype of contemporary art another song is sung in illuminating these desires, one which establishes (somewhat singular) human motives as the primary mode of investigating the entity of relational art. These dialogues exist in an unconscious relation to the ‘structural phenomena’ which creates the basis for its manifesting form. I will now focus on the epiphenomenal aspects (or the manifested form/relational art) and its explanation within the art world to further examine the internal contradictions it rests upon.

As discussed, the simultaneous growth and replicating processes (of the exponential and the meme) have created a situation where art now has (almost) mined all ideas from the conceptual ether and is finding itself in a process of constant recycling and regurgitation. An internal problem arises here: how can the art-world, which is based on its ability to deliver fresh concepts (as an emulation of and amalgamation with high-tech capitalism), continue to live up to these demands to an all-consuming gluttonous audience in its packaging and dissemination of new artistic experiences?

Whether directly conscious of these dynamics or not, aspects of the relational aesthetics movement have sought to resolve this dilemma. Rirkrit Tiravanija is understood as a key figure in the relational art movement. As an omnipresent figure in the development of this type of work process his output seems a fitting specimen to work with. His works often take the form of rooms for sharing meals, cooking, reading or playing music and utilise architecture or structures; living and socialising are also a core elements in his work. This study will focus on the most well-known and intrinsic aspects of this output: cooking for people.

In essence, Tiravanija’s artistic acts or interventions play the role of the cook for the visiting audience, supplying them with a destination, a meal and a means to eat this food. This act in itself supplies the substance for the artwork. The interactions between the consumer and the consumed, as well as the other consumers, constitute the art experience Tiravanija is offering. Like a travelling dinner party, the artist indulges his audience with exotic delights from other gastronomic cultures, alluding to (according to the artist), one of the few forms of intercultural connections people make with other cultures in their daily lives.

While the ‘meta-processes’ within this pataphysical analysis (of this type of work) have been isolated and outlined, can this still exist in tandem with the ‘core implications or defined motives’ of the prevailing relational approach as typified and justified within Tiravanija‘s work? Some would say no. Focusing on the democratic implications and the artworks relation to the social (or the masses), Claire Bishop pursues another analysis, one which describes a different set of dynamics operating within the world, inhibiting the idea of a potential ’democratic immanent togetherness‘ as understood by Tiravanija and Bourriaud. This opens up the next logical question (one which has intrinsic parallels to the pataphysical analysis being pursued): if not this, then what relations are being produced?

In "Antagonism and Relational Aesthetics", Bishop considers important factors in her description of the entities comprising the ‘relational assemblage’. Focusing on the role of the curator, she asks "if relational art produces human relations, then the next logical question to ask is what types of relations are being produced, for whom, and why?” Bishop suggests, “An effect of this insistent promotion of these ideas as artists-as-designer, function over contemplation, and open-endedness over aesthetic resolution is often ultimately to enhance the status of the curator, who gains credit for stage-managing the overall laboratory experience.” (55) She mentions Hal Foster’s warning in the mid-1990s that, “the institution may overshadow the work that it otherwise highlights: it becomes the spectacle, it collects the cultural capital, and the director-curator becomes the star.” (56) A picture is drawn and evaluated here (while somewhat critically) by Bishop, that resembles the meta-processes being described in this study. It is one where hidden processes seem to correspond to the construction of the ‘epiphenomena (relational art)’ rather than the common perception.

Bishop’s questioning of the types of relations being produced, for whom and why, is extended as she continues, stating "the relations set up by relational aesthetics are not intrinsically democratic.” (57) Her description supports one where the (relational) art-world (like other aspects of the world) works to create and harbour a larger situation, where the general effects of the movement offers a productive causality to only a few well-connected agents (insiders). This density of (networked) self-interest is created through a dominant art world participation/understanding (in/of these events) as well as the ascension to a point of stardom of a small few. These factors simultaneously emulate the capitalist conditions it attempts to criticise and exist (somewhat) in opposition with. In other words, although the works claim to defer to their context, they do not question their imbrication within it, whether as conscious agents or not. This exists on the many scales and sites this ‘assemblage’ operates in within the art world. For Bishop this produces no antagonism or tension within the dynamic of democratic exchange, something she sees as intrinsic to this process*. Relational aesthetics self- awareness exists on a false understanding of how the ‘masses’ (or public) work and how it relates to this entity, as well an unconscious understanding of its own meta-construction; perhaps the most important relations it is embedded within.

While Bishop isn’t suggesting that the relational assemblage develops a greater social conscience in terms of content, she is “simply wondering how we decide what the “structure” of a relational aesthetics work comprises, and whether this is so detachable from the work’s ostensible subject matter or permeable with its context.” (58) This observation on the structural conditions of the analysed assemblage follows and critiques a line of theoretical enquiry as espoused by Bourriaud and others; one where the structure of the artwork produces a social relationship and so is therefore the primary micro-political factor in this implied relations. The context and content is somewhat arbitrary; where, what and who Tiravanija disseminates his food to is interchangeable. As Bishop notes, “the quality of the relationships in ‘relational aesthetics’ are never examined or called into question”. This poses an axiomatic issue: what are the qualifiable parameters to assess and define these ‘assemblages’ relation to the ethico-political dimension it advocates? As no framework is outlined with enough comprehensive complexity to map the broader contextual construction that the assemblage and the entities it comprises of exist and emerge from, the ‘potentiality’ of judgement is left in limbo..

To conclude, this study deals with the relations (and their sources of creation) that surround ‘relational art’, or the meta-processes that inform its creation. Bishop’s probing into the social and political frameworks this manifesting epiphenomenon (relational aesthetics) is constructed from and inhabits, aids in illuminating how the identity of this assemblage reveals itself. Upon reflecting on the findings it would appear this dense, algorithmic, self-replicating fabric that permeates our collective actions (as defined by the exponential, interconnected meshworks and the meme) has a larger influence on the patterns of production and the potential logic it might follow, than any utterance or singular intention of any individual or minor collective.

This is a description of the phenomena that combine to comprise the epiphenomena of relational art.

Patterns, Nature & Power

The following text is an article from the journal New Scientist. The story outlines research into power structures within the capitalist economy and the interconnectedness of these networks. According to the study it emulates patterns and processes found in the natural world, a component of the 'sorting process'. This section continues the dialogue into the underlying dynamics shaping the world of art.

AS PROTESTS against financial power sweep the world this week, science may have confirmed the protesters' worst fears. An analysis of the relationships between 43,000 transnational corporations has identified a relatively small group of companies, mainly banks, with disproportionate power over the global economy.

The study's assumptions have attracted some criticism, but complex systems analysts contacted by New Scientist say it is a unique effort to untangle control in the global economy. Pushing the analysis further, they say, could help to identify ways of making global capitalism more stable.

The idea that a few bankers control a large chunk of the global economy might not seem like news to New York's Occupy Wall Street movement and protesters elsewhere (see photo). But the study, by a trio of complex systems theorists at the Swiss Federal Institute of Technology in Zurich, is the first to go beyond ideology to empirically identify such a network of power. It combines the mathematics long used to model natural systems with comprehensive corporate data to map ownership among the world's transnational corporations (TNCs)."Reality is so complex, we must move away from dogma, whether it's conspiracy theories or free-market," says James Glattfelder. "Our analysis is reality-based."

Previous studies have found that a few TNCs own large chunks of the world's economy, but they included only a limited number of companies and omitted indirect ownerships, so could not say how this affected the global economy - whether it made it more or less stable, for instance.

The Zurich team can. From Orbis 2007, a database listing 37 million companies and investors worldwide, they pulled out all 43,060 TNCs and the share ownerships linking them. Then they constructed a model of which companies controlled others through shareholding networks, coupled with each company's operating revenues, to map the structure of economic power.

The work, to be published in PloS One, revealed a core of 1318 companies with interlocking ownerships (see image). Each of the 1318 had ties to two or more other companies, and on average they were connected to 20. What's more, although they represented 20 per cent of global operating revenues, the 1318 appeared to collectively own through their shares the majority of the world's large blue chip and manufacturing firms - the "real" economy - representing a further 60 per cent of global revenues.

When the team further untangled the web of ownership, it found much of it tracked back to a "super-entity" of 147 even more tightly knit companies - all of their ownership was held by other members of the super-entity - that controlled 40 per cent of the total wealth in the **network. "**

In effect, less than 1 per cent of the companies were able to control 40 per cent of the entire network," says Glattfelder. Most were financial institutions. The top 20 included Barclays Bank, JPMorgan Chase & Co, and The Goldman Sachs Group.John Driffill of the University of London, a macroeconomics expert, says the value of the analysis is not just to see if a small number of people controls the global economy, but rather its insights into economic stability. Concentration of power is not good or bad in itself, says the Zurich team, but the core's tight interconnections could be. As the world learned in 2008, such networks are unstable. "If one [company] suffers distress," says Glattfelder, "this propagates."

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"It's disconcerting to see how connected things really are," agrees George Sugihara of the Scripps Institution of Oceanography in La Jolla, California, a complex systems expert who has advised Deutsche Bank.

Yaneer Bar-Yam, head of the New England Complex Systems Institute (NECSI), warns that the analysis assumes ownership equates to control, which is not always true. Most company shares are held by fund managers who may or may not control what the companies they part-own actually do. The impact of this on the system's behaviour, he says, requires more analysis.

Crucially, by identifying the architecture of global economic power, the analysis could help make it more stable. By finding the vulnerable aspects of the system, economists can suggest measures to prevent future collapses spreading through the entire economy. Glattfelder says we may need global anti-trust rules, which now exist only at national level, to limit over-connection among TNCs. Bar-Yam says the analysis suggests one possible solution: firms should be taxed for excess interconnectivity to discourage this risk.

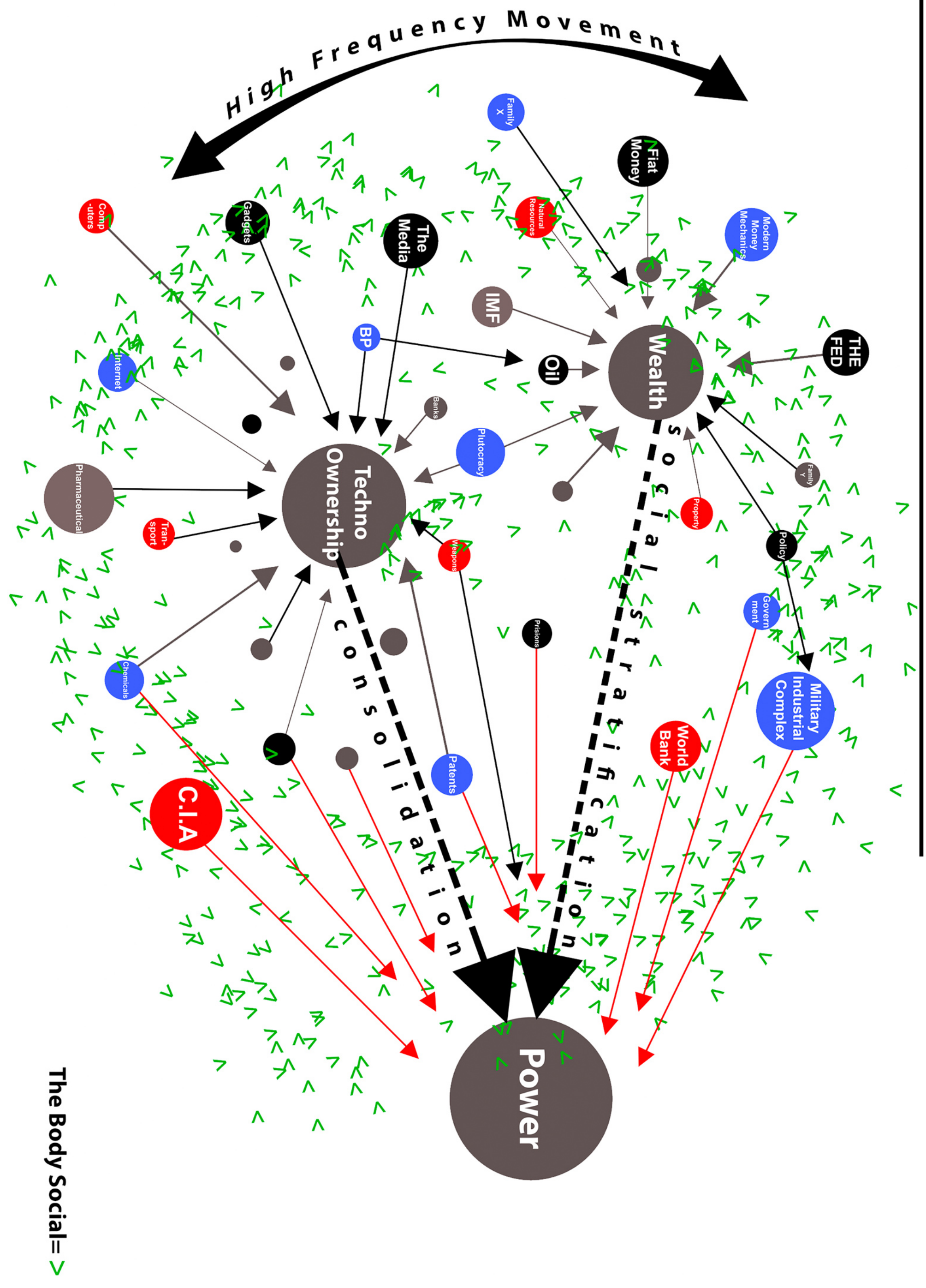
One thing won't chime with some of the protesters' claims: the super-entity is unlikely to be the intentional result of a conspiracy to rule the world. "Such structures are common in nature," says Sugihara.

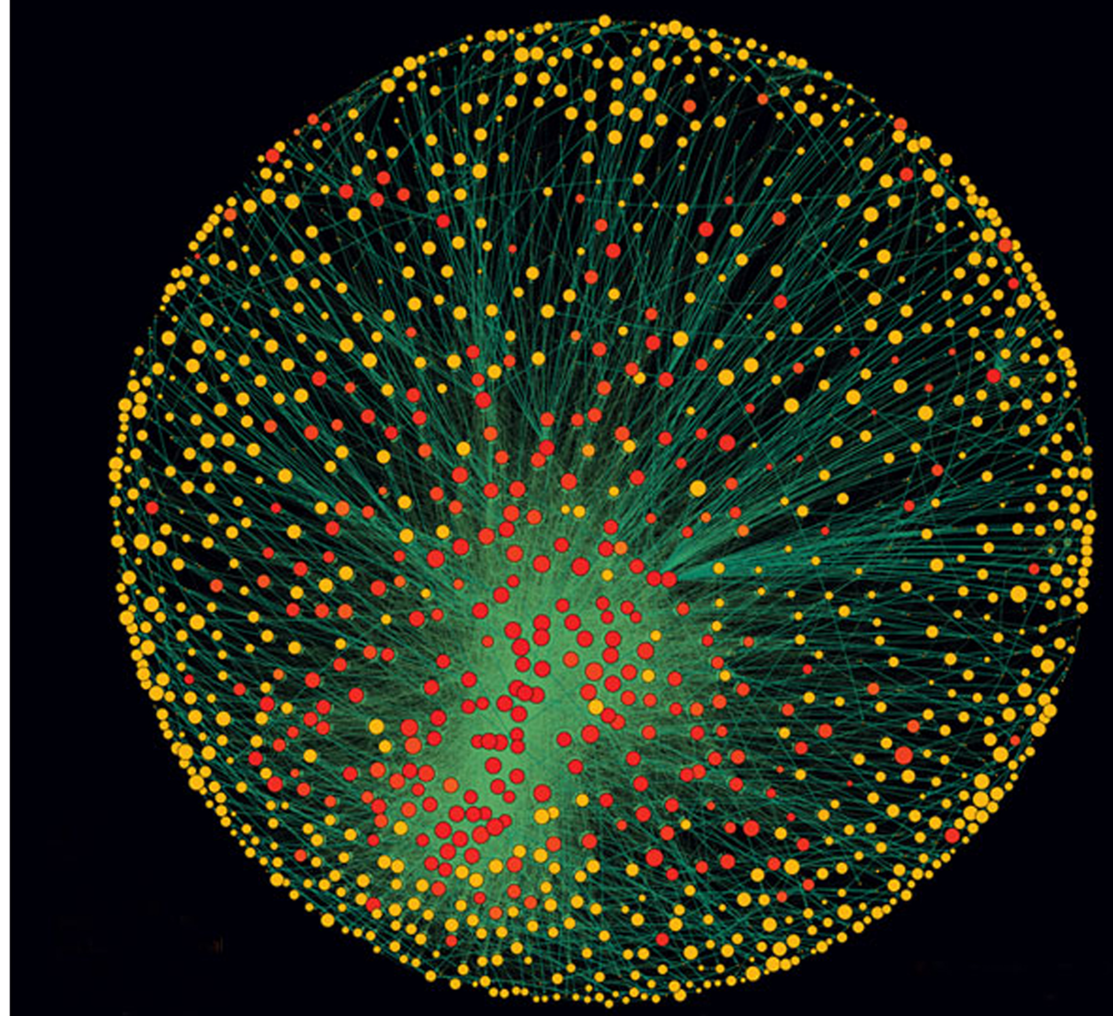
Newcomers to any network connect preferentially to highly connected members. TNCs buy shares in each other for business reasons, not for world domination. If connectedness clusters, so does wealth, says Dan Braha of NECSI: in similar models, money flows towards the most highly connected members. The Zurich study, says Sugihara, "is strong evidence that simple rules governing TNCs give rise spontaneously to highly connected groups". Or as Braha puts it: "The Occupy Wall Street claim that 1 per cent of people have most of the wealth reflects a logical phase of the self-organising economy."

So, the super-entity may not result from conspiracy. The real question, says the Zurich team, is whether it can exert concerted political power. Driffill feels 147 is too many to sustain collusion. Braha suspects they will compete in the market but act together on common interests. Resisting changes to the network structure may be one such common interest.(60)

This super-entity described and the dynamics that produce it echo the conditions the art world exists in (as described in Relational Aesthetics, the Growth of Concepts and the Sorting Process). The processes intertwined with this description and the modelling that makes it possible parallels the general themes of the project, a description of the world through the lens of hyper-modernism and the abstract space it produces. Like many other forms of knowledge and the monitoring that accompanies it, this description of the intrinsic features of the capitalist infrastructure that surrounds us – itself a giant form of simulated encoding – becomes another map or model in this perpetual displacement of the real, the simulation as the real or 'the hyperreal'. (61) The text 'Panic USA: Hypermodernism America's postmodernism' describes this "as a catastrophic implosion of the languages of modern power into a dense and high speed oscillation between meaning and meaninglessness, control and chaos, increased centralization and an orbital spin into abstract and disembodied codes of information". (62)

89 Techno Power





90

expansion point

Conclusion

"A theory does not totalise; it is an instrument for multiplication and it also multiples itself." [63]

The project unfolded is a grand accumulation of abstractions. A mutant combination of ideas, formulas, structures and codes intertwining, one informing the other in a constant cycle of growth and change. The end result in both the gallery work and exegesis becomes the (inevitable) frozen representative moment these interacting forms have crystallised into. Like a snapshot from a petri dish, a city adventure or in a grander historical scheme, the geological forms that surround us, they exist as a particular form in a certain moment in time.

But what is this moment in time that this project inhabits? Does this project respond to something more inherently structural (or difficult to dismiss), as alluded to by some of the outlined sources, or can it be seen as a form of pessimism; perhaps a complex Luddite position, fitting for the early twenty-first century? Neither might be the best answer. While the project is predominantly informed by processes rather than determinist narratives, it simultaneously sees this construction as an act of creation rather than an attempt to describe objective information.

But is that too easy – the creation of an unproblematic space to understand the nature of the project's content within – considering the urgency and cautious character (at times) used to describe these processes? Perhaps caution, panic and exigency could be understood as the central predominant dynamics in the world and any creation that attempts to embody a becoming with the technological dynamics and a situation of 'now' finds it difficult to inhabit any other guise? Within all scales of life and from the multitude of sources that inform and attempt to shape our understanding of it, it seems the reptilian brain is the one most pitched to; and from our armchairs in the developed world, devoid of genuine daily life/death concerns, we seem to love and thrive within it.

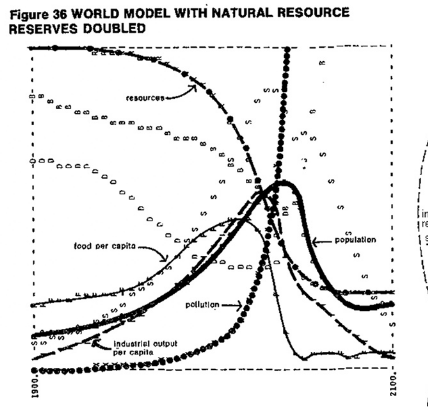
The cautionary message has its own dynamic, its own primitive chemistry – one which appears to exist in contradiction in today's world. We get aroused, provoked, and stimulated and then the urgency dissipates back to neutral, as we (unconsciously) anticipate the next highly charged warning or threat to be announced and then forgotten. Just like Geoffrey West's analysis of the accelerating city which conditions biological changes in its inhabitants, the project finds it difficult to not see the larger technological framework enveloping the world as devoid of these types of physiological tinkering. This could very well be understood as a manifested contemporary component of the 'machinic phylum'. This process exists as a series of singularities in the material world between the grand technological machinery it has shaped and the biological subjects it houses, who simultaneously keep it churning while being controlled by it rhythms.

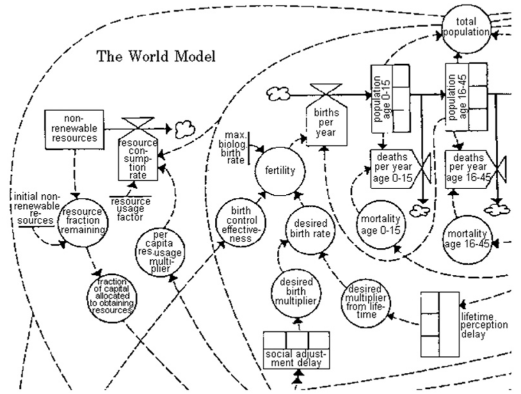
Deleuze describes a form of cartography that, at least in poetic and artistic terms (for this project), might be useful in sketching an outline of the interrelating territories people inhabit, as well as allude to the potential redeeming quality that the project may harbour in relation to the frenzy it conceptualises. Intensive and extensive cartography delineates a theoretical assemblage which would seem to be of purpose for the type of mapping that the project circumnavigates. Manual De Landa in "Deleuze: History and Science" explains:

As biological organisms and as social agents we live our lives within spaces delimited by natural and artificial 'extensive boundaries', that is, within zones that extend in space up to a limit marked by a frontier. Whether... the frontiers of a country, a city, a neighbourhood, or an ecosystem; or about the defining boundaries of our bodies – our skin, our organ's outer surface, the membrane of our cell – inhabiting these extensive spaces is part of what defines our social and biological identities. We also inhabit other spaces, 'zones of intensity', the boundaries of which are not defined by spatial limits but by critical thresholds: the zones of high pressure explored by deep-sea divers; the zones of low gravity lived by astronauts; the zones of high speed traversed by test pilots... we all populate these intensive zones even if at much moderate intensities.[64]

The (technological) singularity (the point where the exponential growth of technology moves beyond a critical threshold into an unimaginable phrase) and its implication for the human subject (both as individual and mass) is a prime, albeit complex example of these dual zones converging. It expands through extensive space, from the nano, micro, digital, city, global and interplanetary scale. It also permeates through intensive spaces from the gradients of speed, temperature, pressure and density, as well as other biochemical differences of intensity that occur (in feedback) between its inhabitants.

The project is caught in this cartographic process. A mapper of these critical zones of thresholds, a combination of extensive and intensive overloads which can only speed up. The sentiment of this zone hovers somewhere between urgency and contradiction. The pataphysical approach implicit within the project allows this to occur and for a sketch to be outlined while not getting unconsciously trapped in abstractions; a process it explores in itself. Heidegger and his polemic text on technology is a prime illumination and description of this abstracting process, or what he calls 'enframing'. However, beyond this 'essence of technology' Heidegger offers other avenues for reflection and realisation.





(91) & (92) *The limits to growth*- The enframed world par excellence. Early systems theorist vision of the world and its inhabitants.

Because the essence of technology is nothing technological, essential reflection upon technology and decisive confrontation with it must happen in a realm that is, on the one hand, akin to the essence of technology and, on the other, fundamentally different from it. Such a realm is art. But certainly only if reflection on art, for its part, does not shut its eyes to the constellation of truth after which we are questioning.[65]

This brings the discussion back to Claire Bishop and her essay 'Antagonism and Relational Aesthetics' and the reiteration of two points of critical enquiry: the democracy of art and its awareness of itself within what could be seen as the 'enframed circuit' conditioning the production, reception and distribution of contemporary art. While these points have been highlighted within the exegesis it's interesting to note the artistic approaches Bishop promotes as more productive and redeeming than her analysis of Rirkrit Tiravanija (as mentioned in the section 'Pataphysical Approaches to Understanding Contemporary Phenomena').

Thomas Hirschhorn is one such artist for Bishop. Whether any mode of operation can really penetrate the 'neutralising information flow' that showers and bathes us, the micro-political actions and movements of Hirschhorn at least seem more productive than the similar claims of artists like Tiravanija. Hirschhorn claims to not make political art but make art political. As he explains:

I do not want to invite or oblige viewers to become interactive with what I do; I do not want to activate the public. I want to give of myself, to engage myself to such a degree that viewers confronted with the work can take part and become involved, but not as actors... I do not want to do an interactive work. I want to do an active work. To me, the most important activity that an art work can provoke is the activity of thinking... An active work requires that I first give of myself.[66]

(93) Thomas Hirshhorn *Wirtschaftslandschaft Davos,*Mixed Media Installation, Dimensions Variable, 2011.

Hirschhorn's massive all-encompassing 'monuments' are processing machines. This exists in two modes: (1) that which has been processed and (2) that which will be processed. This work fuses the everyday detritus of life and the systems that produce it into complex interactions and interconnections, the installations become enclosing worlds, mapping global systems, philosophical modes of though, patterns of consumption etc. The viewer is invited into an artistic zone that opens up to the outside world, rather than inclosing itself in its own systems, networks and modes of relations. The dense, immersive and ubiquitous character of how Hirschhorn works and processes his material world through his artwork is what creates these conditions. Hirschhorn works from an idea. Hirshhorn's mode of operation may well have been a form of artistic reflection that Heidegger may have seen as not shutting its 'eyes to the constellation of truth after which we are questioning'.[67]

Hirschhorn is a mapper of political, global and technological conditions within the world, in both an extensive and intensive sense. His rhizomatic approach works with a fragmented form of the body political rather than the 'democratic' subjectivity of immanent togetherness as inherent in the sentiment of the relational art Bishop sets up as a point of comparison with Hirschhorn. In this sense, Hirshhorn multiples the potential 'becoming's' an audience may have with his work, not from setting up a structure of participatory openness, but by himself 'becoming' with a multitude of processes and ways to know and understand and be affected in the world.

For this project the dynamic of a multiplied 'becoming' growing out in many directions, suggesting a web of complex associations and connections, has been integral to the development of the work and the illumination of its subject matter. From the perspective of the exegesis (or more specifically the unique organisation and structure it takes and its move to broaden the parameters this form may 'become'), it is worth mentioning the historic trajectory this academic form exists in (exits from), within the context of Australian creative degrees and their accompanying texts.

Nigel Krauth's research focuses on the evolution of the exegesis in Australia.[68] While only focusing on doctorates degrees, the progression delineated is still relevant to this project. Within his research, Krauth outlines the trajectory of the creative writing doctorate since its implementation by Edward Cowie, in 1985.[69] Cowie's background spanning arts/music and scientific discourses allowed insights into how the research practises (particularly) in the sciences as well as humanities (within the 80s) was also applicable to the creative arts. Whether valid not, the framework that followed was based on scholastic rigour and strategic thinking in the construction of an academic analysis of the artists practice, codified within a broader (verifiable, linear and contextual) university structure from which it emerged.

Jumping to the early 2000s, the idea of this direct self-reflectivity of one's practice and the alignment of linear contextual analysis started to be questioned. This critique encompassed many creative forms and the accompanying texts being produced- from novels, poetry as well as artistic forms associated with the fine arts. The exegesis became fictocritism (thesis-slash-novel)[70], discontinuous narratives[71] and the combination of academic prose/poetry/whale songs/raw notes/physiological observations[72]. This process culminated in 2010 to the point where the exegesis became a runaway text and its direct (or even in direct) connection as reflection/explanation migrated to a parallel text where the researcher argued successfully for there being no logic at all between an exegesis and its accompanying creative product.[73]

"In truth, it is not enough to say 'Long live the multiple', difficult as it is to raise the cry. No typographical, lexical, or even syntactical cleverness is enough to make it heard. The multiple must be made."[74]

While not adhering strictly to this position (of no necessary link at all), this research project does find an alliance with these approaches, of what could be understood as a 'decoding or deterritorialisation'* of the language structure that is integral to the construction of 'artist as researcher' as well as the 'virtual potential' this may exist as and become. These approaches, whether consciously defined in this way, are varied examples of research that emerges from 'centres': methodologies that grow out of themselves and move beyond the prescribed framework for textual accompaniments whilst broadening the potentiality of reflection and explanation. It parallels other developing research methodologies, within an Australian context, that utilise the rhizome as an organisational structure. This endeavour exists not only within certain artistic practices and accompanying explanation but also in new approaches and understanding of educational methods (primary and secondary) as well as areas of geography and environmental studies etc. This movement represents a shift to a more self-reflexive awareness and understanding of the conditions and historical constructions that inhabit pedagogical assembly and a push to more productive and less inhibiting models.[76]

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* Deterritorialisation can describe any process that decontextualises a set of relations, rendering them virtual and preparing them for more distant actualisations. [74]

Upon the finality of reflection, it is this logic of emerging from centres that defines this project’s collective processes most concisely. Seeming almost too obvious to mention as an initial point of departure, this research privileges the multitude of dynamics and ways that I as researcher emerge from centres. This understanding of ‘emerging from centres’ involves numerous aspects of the world that construct my life. This includes from the evolving technological assemblages that construct the foundations for it and the vast material world which constructs the potentiality and particularities of its form. Or to shorter timeframes that define the construction and enforcement of the language parameters that enable/restrict both the artistic production and textual accompaniment of this thesis.

The final result in both the gallery work and exegesis it a multitude of realities concurrently co-existing within the work. The project hasn’t produced a standardised, determinate and conclusive body of knowledge but allows for emergent understandings through being or inhabiting the processes of exponential growth. This awareness constructs an understanding of technology that is multi-faceted, exploring not just the physical presence of this force but also attributes of it that restrict ‘potential’ aspects within the human realm to exist. The project aims to exist within an awareness of these phenomenon simultaneously exploring a condition where practice /subjectivity looks to observe and scrutinise itself, as an act in itself, taking this awareness to then look out and depart from. From this, the work hopes to subtly confuse, confound and disrupt these operations so new emergent forms may arise.

Appendix (A)

(endnotes)

Endnotes (Appendix A)

Introduction

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The Golden Triangle

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Conclusion

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Appendix (B)

(imagelist)

Image list- (Appendix B)

(Numbers in (*) indicates works produced by the artist for the project).

1. Marcel Duchamp
The Bride Stripped Bare by Her Bachelors, Even (The Green Box)
Box containing collotype reproductions on various papers
33 x 28.3 x 2.5cm
1934
Metropolitan Museum of Art, New York

(2.) Gallery Map- (Gallery Maps refers to maps in the exhibition)
Circuit to Paper
Digital collage on paper
80 x 60cm
2010

(3.) Gallery Map
The Formula for the Production of Art (part B)
50 x 100cm
Chalk on blackboard
2009

(4.) The lottery of Babylon
Digital collage
2011.

(5.) Gallery Map
The Formula for the Production of Art (part A)
50 x 100cm
Chalk on blackboard
2009

(6.) Laughter of the Height
Digital collage
2011

(7.) Technology
Digital collage
2011

(8.) Technology and process
Digital collage
2011

(9.) Gallery Map
The Golden Triangle (modified)
Digital collage on paper
80 x 60cm
2011

(10.) Exponential Growth
Digital collage
2011

(11.) Rice and Growth
Digital collage
2011

(12.) Gallery Map
Techno Time vs. Information
Digital print on paper
60 x 80cm
2010

13. Emok
Mollier enthalpy entropy chart for steam- US units
Diagram
From the Website- Wikipedia, the free encyclopaedia. November 2, 2010. Accessed June 10, 2011.
http://en.wikipedia.org/wiki/File:Mollier_enthalpy_entropy_chart_for_steam_-_US_units.svg
This is an image from the Wikimedia Commons

(14.) Gallery Plan Overlay
Digital design
2011

(15.) Exponential vs. Gallery Plan
Digital collage
2011

16. The Periodic Table
Table
From the website- Particles and Reactions- The Periodic Table of Elements. July 6, 2009. Accessed on April 14, 2011.
http://granvillescience.wikispaces.com/Particles+and+Reactions+-+The+Periodic+Table+of+Elements
This is an image from the Wikimedia Commons

(17.) Gallery Map
Name to come
Digital collage on paper
80 x 60cm
2011

(18.) Gallery Map
DPI
Digital print on paper
80 x 60cm
2011

(19.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(20.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(21.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(22.) Assemblage 4
The General, The Particular, The Virtual (detail)
Mixed media installation
Dimensions variable
2009

(23.) Gallery Map
DPI (detail)
Digital print on paper
80 x 60cm
2011

24. 2 Dollar shop
Photograph
From the Website- Orbost, Heart of the Snowy River country. Accessed on July, 2011.
http://www.orbost.biz/index.php?option=com_content&view=article&id=44:orbost-tyre-service-&catid=10:transport--vehicles&Itemid=45

(25.) DPI- Modified
Digital collage
2011

(26.) Assemblage 3
Centres feeding of centres which feed of centres (detail)
Photographic print
70 x 80cm
2009

27. Dice
Photograph
From the website- I love Maths. Accessed on July 9, 2011.
http://maths-problems.blogspot.com/p/scrabble_14.html

28. Andreas Gursky
99 Cent
Chromogenic colour print
207 x 337 cm
Courtesy Matthew Marks Gallery, New York, and Monika Sprüth Galerie, Cologne
1999

29. Crates
Photograph
From the Website- Further and Better, August 4, 2011. Accessed on August 20, 2011.
http://furtherandbetter.blogspot.com/

30. Grid
Diagram
From the Website- Barco Data 800. Accessed on July 20, 2011.
http://www.lynxxx.nl/barco/videopatterns.asp

31. Form
Photograph
From the Website- Ecvv.com. Accessed on July 20, 2011.
http://www.ecvv.com/product/1797165.html

32. World Map
Map
From the Website- Better World. August 16, 2011. Accessed on July 21, 2011.
http://betterworld-canaan.blogspot.com/2011/08/energy-climate-change-and-water-links.html

33. Robert (username) from Zoetermeer, Netherlands.
Computers scaled
Photograph
From the Website- Wikimedia Commons. December 15, 2009. Accessed on July 20, 2011.
http://commons.wikimedia.org/wiki/File:Lenovo_Thinkpad_-_Three_different_sizes.jpg
This is an image from the Wikimedia Commons

34. Martin, James D., and Todd Thornton
Structural Variations
Diagram
From the Website- Free Patents Online: Templated compositions of inorganic liquids and glasses. September 14, 2009. Accessed on July 22.
http://www.freepatentsonline.com/6790382.html

35. Production Line
Photograph
From the Website- GN Store Nord A/S. Accessed on July 24.
http://www.gn.com/SiteCollectionImages/Press%20Room/Download%20images/GN%20factory%20Xiamen%20production%20line.jpg

36. Carroll Harmon
Machinic grafting system
Diagram
From the Website- Free Patents Online: Plant Grafting System. June 10, 2003. Accessed on May 17, 2011.
http://www.freepatentsonline.com/6574916.html

(37.) Grafting
Digital collage
2011

(38.) Rhizomatic Growth
Digital collage
2011

39. Diffusion (a)
Diagram
From the Website- Hyson Bisons: Cells. Accessed July 28.
http://hysonsbisons.wikispaces.com/cells
This is an image from the Creative Commons

(40.) Diffusion (b)
Digital collage
2011

41. Diffusion (c)
Diagram
From the Website- Wikipedia: Diffusion. 19 August, 2009. Accessed July 28.
http://en.wikipedia.org/wiki/Diffusion
This is an image from the Wikimedia Commons

(42.) Fractalogy
Digital collage
2011

(43.) Fractalogy Just- Line
Digital design
2011

44. Mysticrainbow
Fractal image
Digital Image
From the Website- Zootool. Accessed April 30, 2011.
http://zootool.com/watch/ul1uz2/

(45.) Fractalogy 2
Digital collage
2011

(46.) Gallery Map
Techno Art Processes (modified)
Digital print on paper
80 x 60cm
2010

(47a.) Systems Diagram
Digital collage
2011

(47b.) Pre-Phase
Studio Work
Mixed media installation
Dimensions variable
2008

Assemblage 1
Produced for the show- Processing Hypertelia
Mixed media installation
Dimensions variable
July 2009

Assemblage 2
Produced for the show- 4 Equations
Mixed media installation
Dimensions variable
September 2009

Assemblage 3
Produced for the show- Centres that feed of Centres that feed of Centres
Mixed media installation
Dimensions variable
October 2009

Assemblage 4
Produced for the show Ono as- The General The Particular The Virtual
Mixed media installation
Dimensions variable
November 2009

Assemblage 5
Subsystem (a-e) 5 Drawings
Greylead on paper
76 x 57cm
June 2010

Assemblage 6
Card Castle Decision (a-b) 2 Prints
Photo prints
140cm x 300cm
April 2010

Assemblage 7
As Part of the show In Teers as- Techno/Water/Power
Assemblage 7 section-
Polystyrene balls, tooth picks and paint
Dimensions variable
April 2011

Assemblage 8
As Part of the show In Teers as- Techno/Water/Power
Assemblage 7 section-
Acrylic paint on canvas
500cm x 180m
April 2011

(48.) Map 2 Territory
Drawing
2011

49. Tomruen
Mass Image
CAD Diagram
From the Website- Wikipedia: Schlegel half-solid bitruncated 16-cell. March 17, 2007. Accessed June 29, 2011.
http://en.wikipedia.org/wiki/File:Schlegel_half-solid_bitruncated_16-cell.png
The image is part of Wikipedia commons

50. Tomruen
Fragment image
CAD Diagram
From the Website- Wikipedia: Johnston Solid 16.net. June 28, 2008. Accessed June 29, 2011.
http://en.wikipedia.org/wiki/File:Johnson_solid_16_net.png
The image is part of Wikipedia commons

(51.) Assemblage 3
Centres feeding of Centres which feed of Centres (detail)
Photographic print
70 x 80cm
2009

(52.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

53. Nanorex
Structural DNA Nanotechnology
From the Website. Nanotechnology Gallery. November 6, 2005. Accessed on June 3, 2011.
Informational poster
http://www.somewhereville.com/?page_id=10

(54.) Assemblage 7
Techno/Water/Power (detail)
Mixed media installation
Dimensions variable
2011

(55.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(56.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(57.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(58.) Assemblage 1
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(59.) The Sorting Process
Digital collage
2011

(60.) Pre-Phase
Studio Work (various views)
Mixed media installation
Dimensions variable
2008

(61.) DPI
Digital print on paper
80 x 60cm
2011

62. Sea Level Variations
Diagram
From the Website- Graph of sea ice extent over time. Accessed May 17, 2011.
http://data.aad.gov.au/aadc/envi/index.cfm

(63.) Assemblage 1- Diagrammatic
Produced for the show- Processing Hypertelia
Mixed media installation
Dimensions variable
2009

(64.) Assemblage 3- Multiple Views
Produced for the show - Centres that feed of Centres that feed of Centres
Mixed media installation
Dimensions variable
2009

(65.) Assemblage 4
Produced for the show Ono as- The General The Particular The Virtual
Mixed media installation
Dimensions variable
2009

(66.) Assemblage 1 (studio view- mid construction)
Processing Hypertelia (detail)
Mixed media installation
Dimensions variable
2009

(67.) Assemblage 6- Construction details
Card Castle Decision (a-b)
Photo prints
140cm x 300cm
2010

(68.) Assemblage 6
Card Castle Decision (a)
Photo prints
140cm x 300cm
2010

(69.) Assemblage 6
Card Castle Decision (b)
Photo prints
140cm x 300cm
2010

(70.) Assemblage 5
Subsystem (a-e) 5 Drawings
Greylead on paper
76 x 57cm
2010

(71.) Gallery Map
G.L.K
Digital on paper
80 x 60cm
2010

(72.) Blue Accident
Digital collage
2011

(73.) Map/Integral/Accident
Digital collage
2011

(74.) The Ways Things Flow
Digital collage
2011

(75.) Peter Fischli and David Weiss
The Ways Things Go
Film Still
30 minutes
1987

(76.) Peter Fischli and David Weiss
The Ways Things Go
Film still
30 minutes
1987

(77.) The World meets Suburbia
Digital collage
2011

Collage elements include:

Simon Evans
The World
Mixed media on paper
150 x 200cm
2003

(78.) Mappi Mundi Vs. Mappi English
Digital collage on paper
42 x 30cm
2011

Collage elements include:

Richard of Haldingham and Lafford
Hereford Mappi Mundi
Ink on Vellum
158 cm by 133 cm
c.1300

Hereford Cathedral in Hereford, England
&

Grayson Perry
Map on a Englishman
Etching
2004
Edition of 50
150 x 120 cm

(79.) Gallery Map
Contingency and Art
Digital print on paper
80 x 60cm
2011

(80.) Rat and Bear- 1+1 Equals 0
Digital collage
2011

(81.) Move through Opposites
Digital collage
2011

82. Matthew Ritchie
The Fast set (installation Views)
Museum of Contemporary Art, North Miami
2000

83. Matthew Ritchie
The Slow Tide, In Concentration 38 (installation Views)
The Dallas Museum of Art
2000

84. Matthew Ritchie
Afterlives (Installation Views)
Andreas Rosen Gallery
2002

(85.) Chance, Information, Implosion
Digital collage
2011

Collage elements include:

Michelangelo
Sistine Chapel Ceiling
Paint on fresco
40 x 16m
1508-12
Vatican City. Italy

Matthew Ritchie
The Big Life
Oil and marker on canvas
223 x 391cm
2002
Collection John Kaldor, Sydney, Australia

(86.) The Techno Verse- Exploded
Digital collage
2011

(87.) Relational Mechanisms
Digital collage
2011

88. Dave Stock
The Occupy Wall Street movement
photograph
2011
From the website
www.newscientist.com/articleimages/mg21228354.500/1-revealed--the-capitalist-network-that-runs-the world.html October 11, 2011. . Accessed October 12, 2011.

(89.) Gallery Map
Techno Power
Digital print on paper
80 x 60cm
2011

90. Diagram showing interconnected new of corporate wealth
2011
From the website
www.newscientist.com/articleimages/mg21228354.500/1-revealed--the-capitalist-network-that-runs-the world.html October 11, 2011. . Accessed October 12, 2011.

91. D.H. Meadows, D.L. Meadows, J. Randers and W.W. Behrens
Diagram
Limits to Growth- pg 124
(A report for the Club of Rome's project on the predicament of mankind)
1972

92. D.H. Meadows, D.L. Meadows, J. Randers and W.W. Behrens
Diagram
From: Limits to Growth
(A report for the Club of Rome's project on the predicament of mankind)
1972

93. Thomas Hirshhorn
Wirtschaftslandschaft Davos
Mixed Media Installation
Dimensions Variable
2011

Appendix (C)

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Appendix (D)

(Exhibition images)

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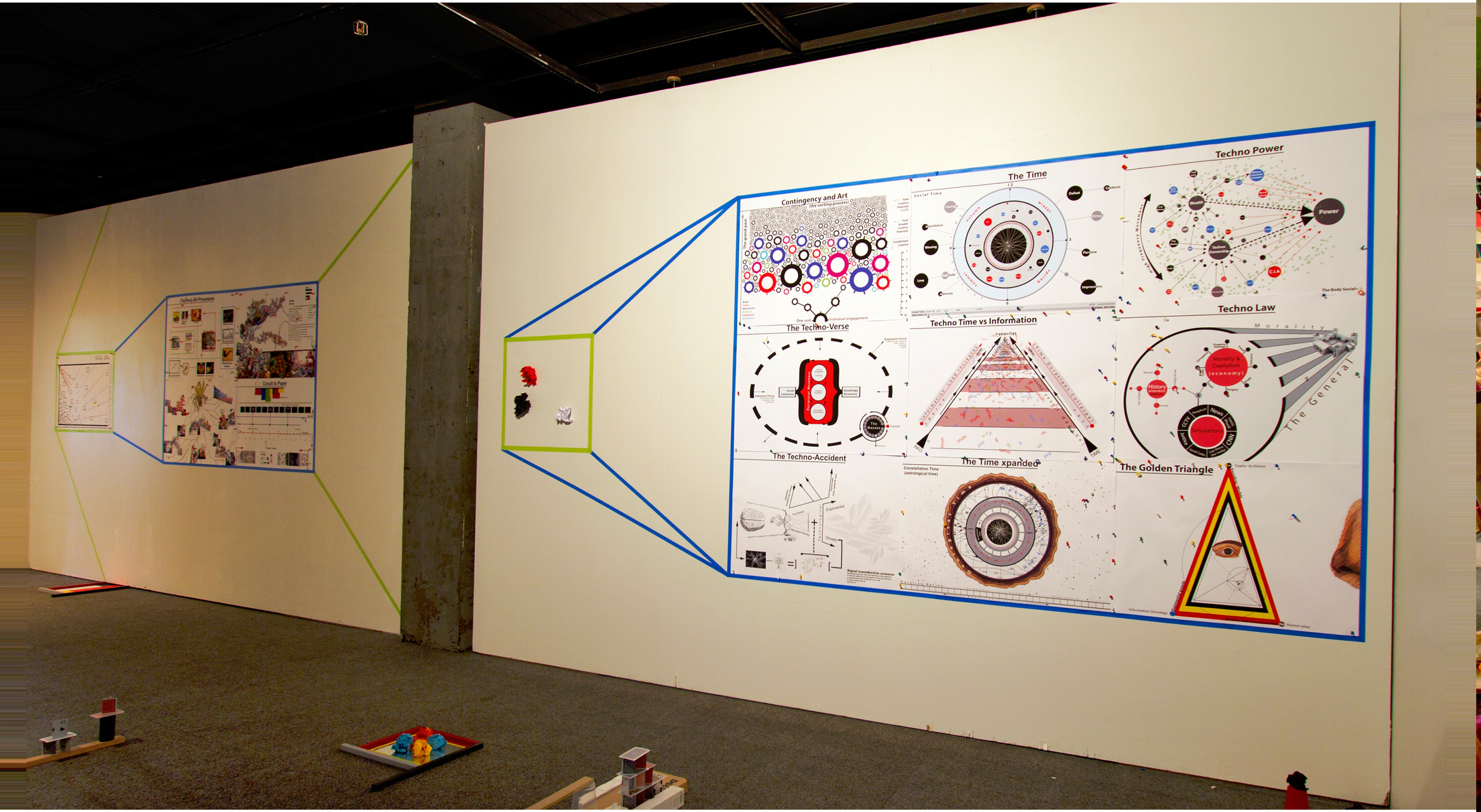
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The Techno-Verse
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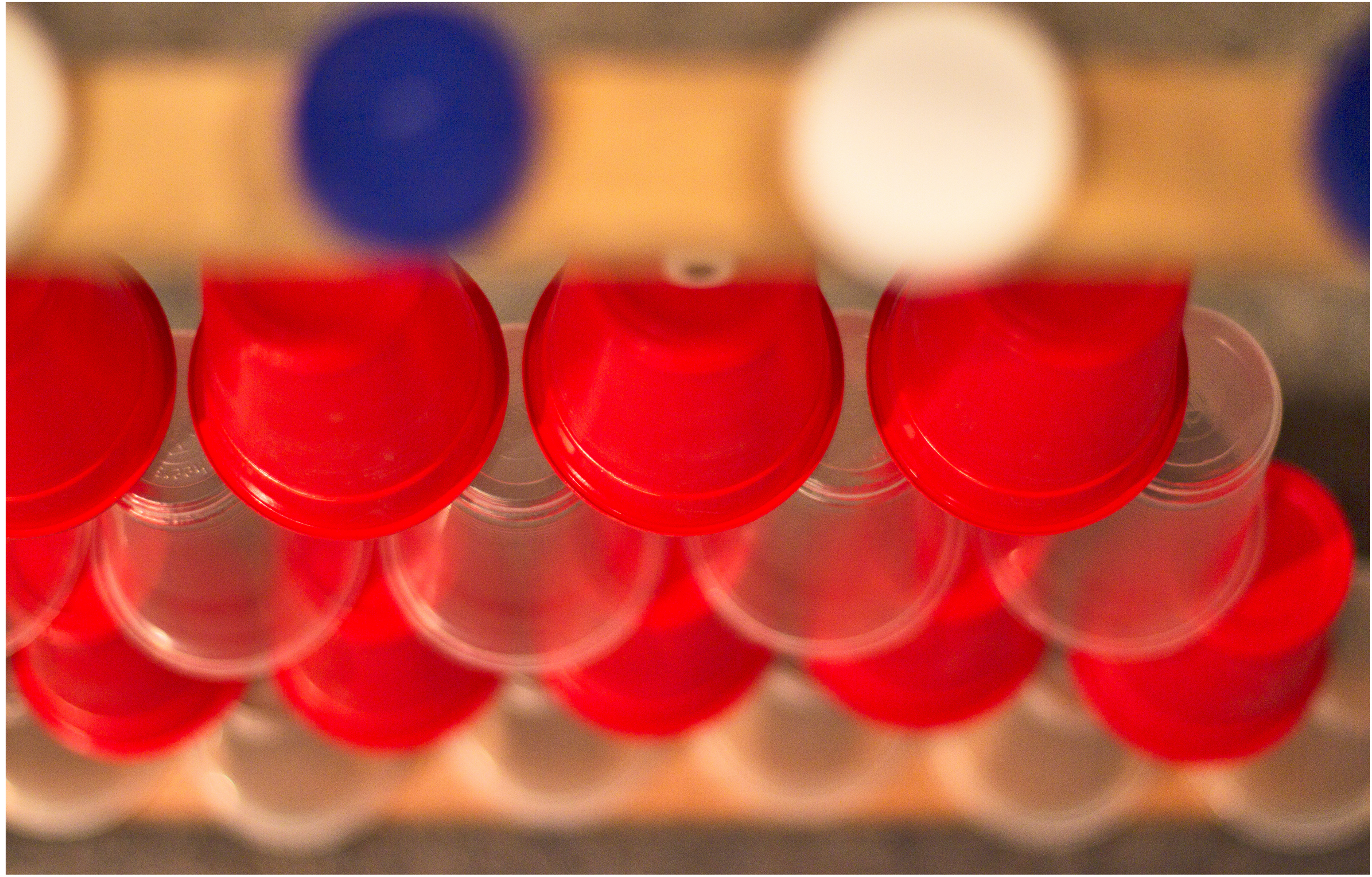

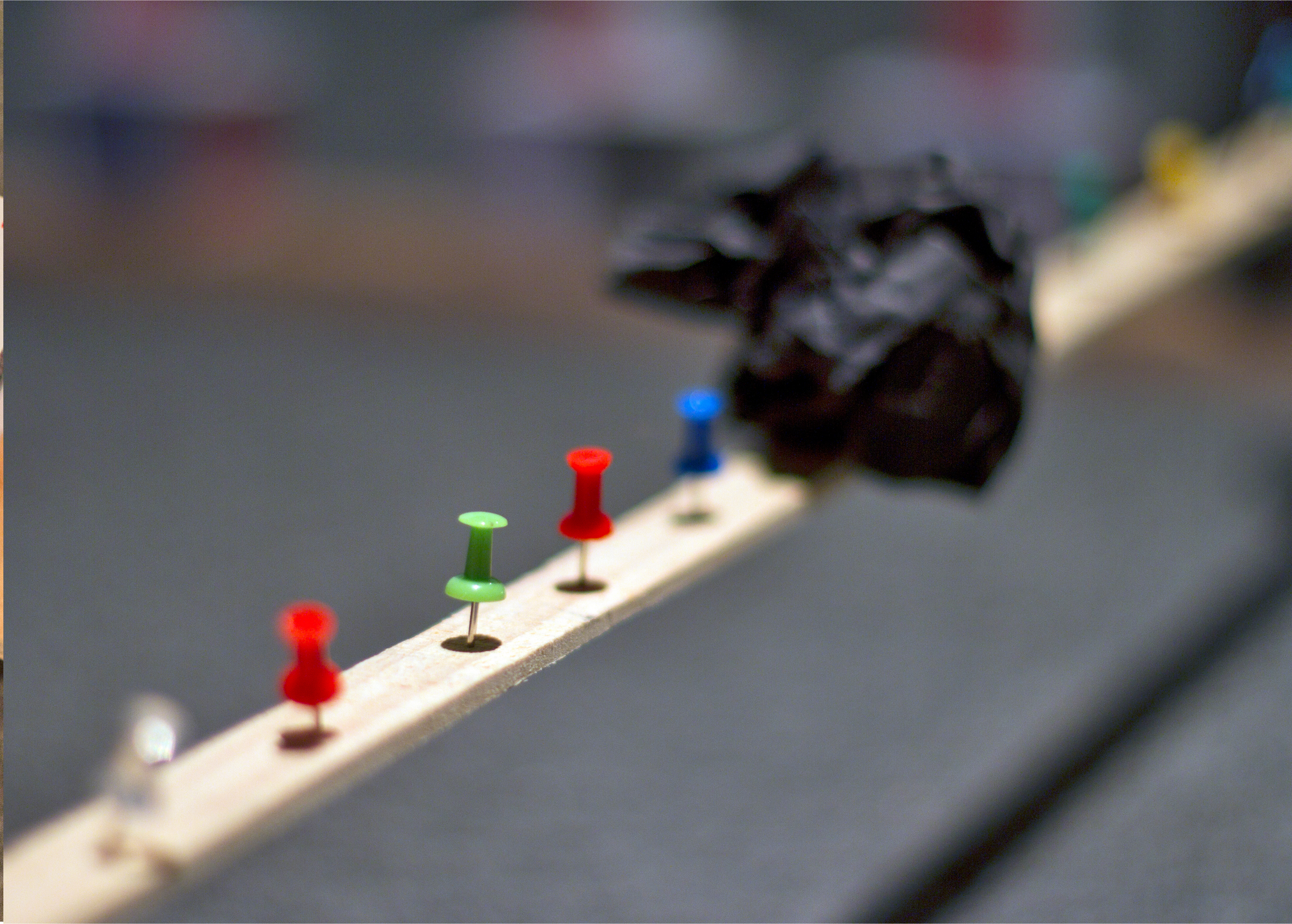


Time Enough
THE PELICAN HISTORY OF ART
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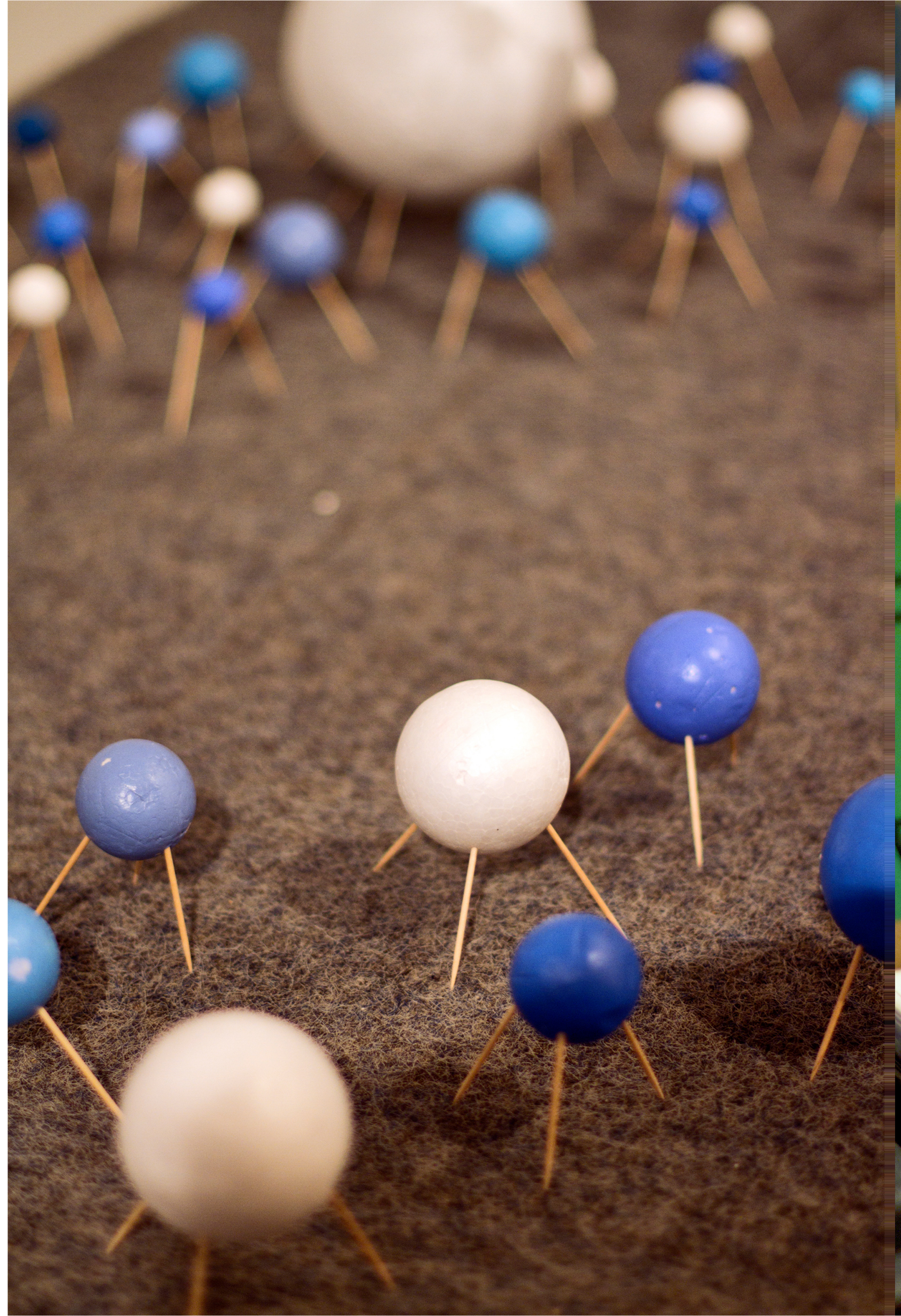

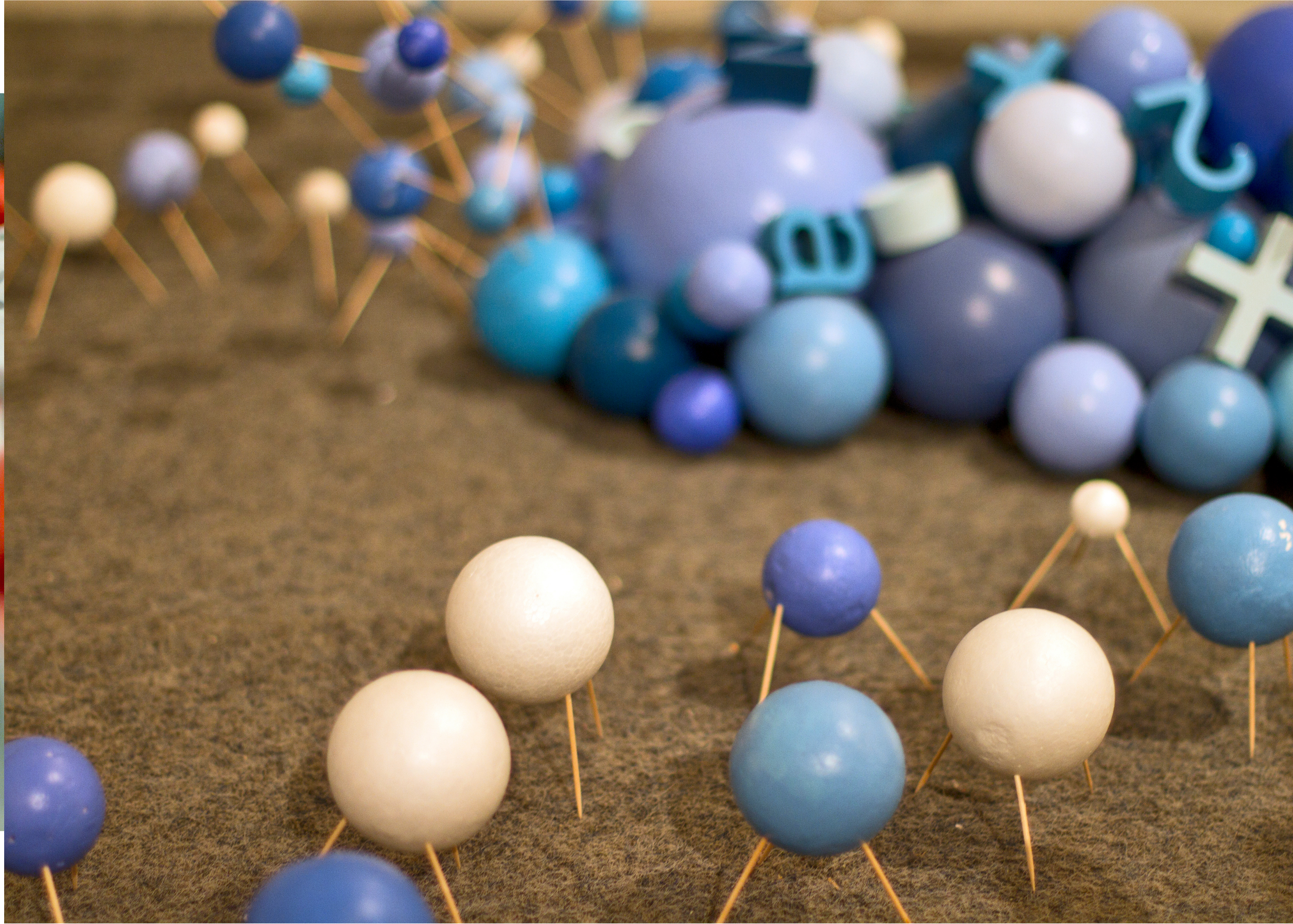

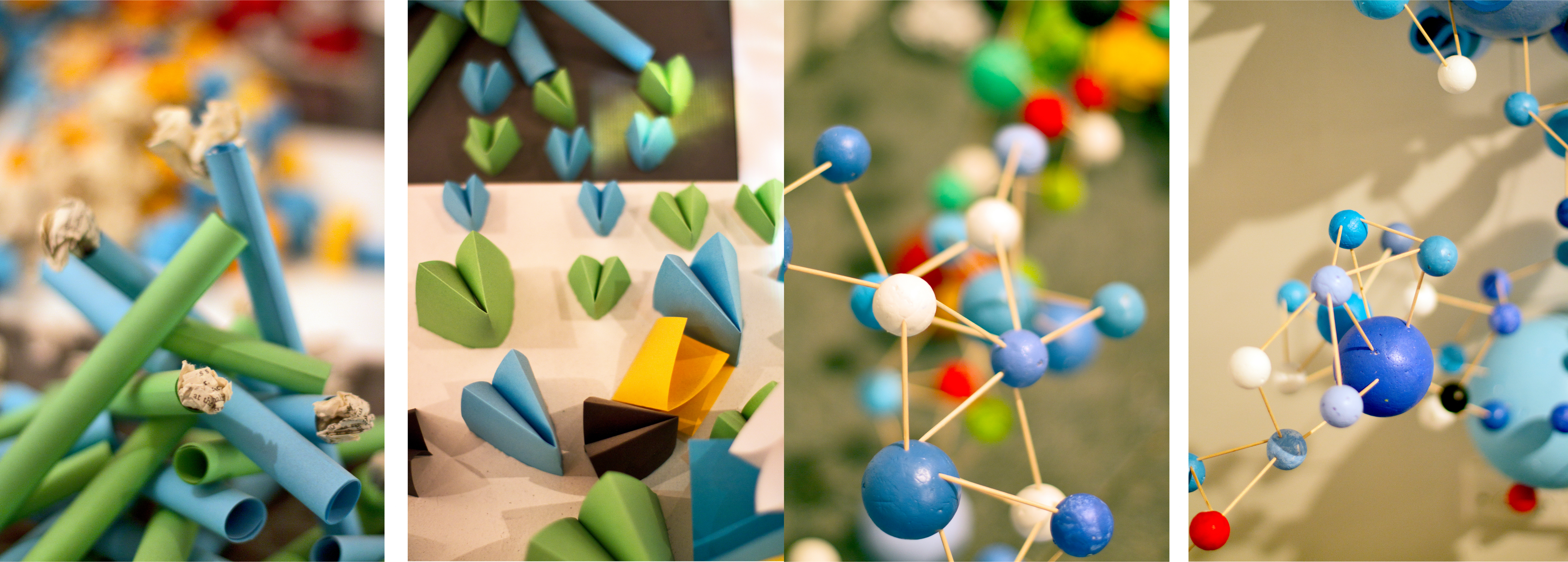


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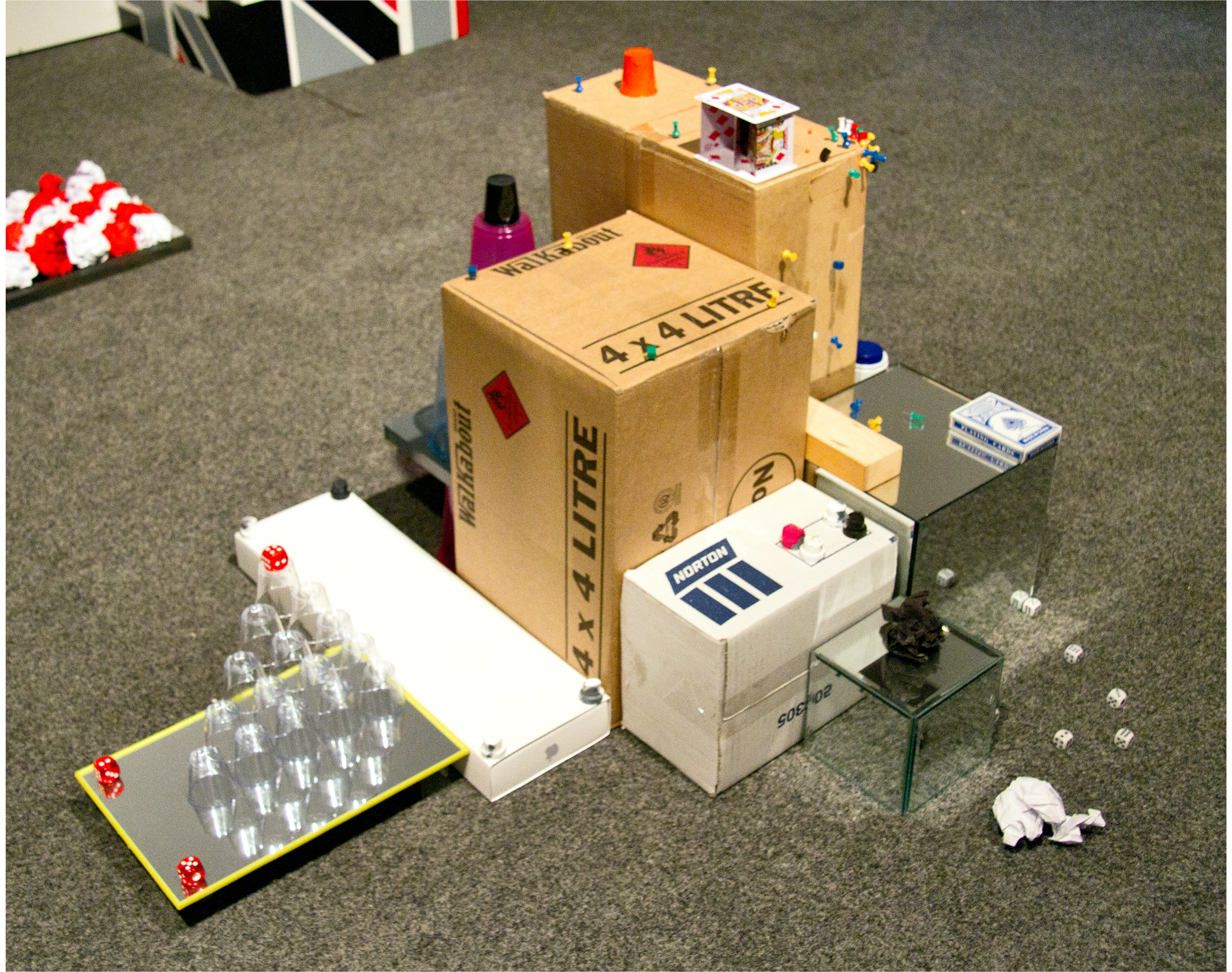
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Robert Dubin
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Building